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Review

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Does addressing gender inequalities and empowering women and girls improve health and development programme outcomes?

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Abstract

This article presents evidence supporting the hypothesis that promoting gender equality and women's and girls' empowerment (GEWE) leads to better health and development outcomes. We reviewed the literature across six sectors—family planning (FP); maternal, newborn and child health (MNCH); nutrition; agriculture; water, sanitation and hygiene; and financial services for the poor—and found 76 studies from low and middle-income countries that met our inclusion criteria. Across these studies, we identified common GEWE variables that emerged repeatedly as significant predictors of sector outcomes. We grouped these variables into 10 thematic categories, which we termed 'gender-related levers'. These levers were then classified by the strength of evidence into *Wedges*, *Foundations* and *Facilitators*. Wedges are gender-related levers that had strong associations with improved outcomes across multiple sectors. They include: 'control over income/assets/resources', 'decision-making power' and 'education'. Elements of these levers overlap, but combined, they encapsulate agency. Increasing female agency promotes equality and broadly improves health and development for women, their families and their communities. The second classification, Foundations, displayed strong, positive associations across FP, MNCH and nutrition. Foundations have a more proximal relationship with sector outcomes and include: 'equitable interpersonal relationships', 'mobility' and 'personal safety'. Finally, the third group of levers, Facilitators, was associated with improved outcomes in two to three sectors and include: 'access to information', 'community groups', 'paid labour' and 'rights'. These levers make it easier for women and girls to achieve their goals and are more traditional elements of development programmes. Overall, gender-related levers were associated with improvements in a variety of health and development outcomes. Furthermore, these associations were cross-sectoral, suggesting that to fully realize the benefits of promoting GEWE, the development community must collaborate in coordinated and integrated ways across multiple sectors. More research is needed to identify the mechanisms by which gendered interventions work and under what circumstances.

Key words: Agency, agriculture, development, empowerment, family planning, gender, maternal and child health, nutrition, public health, water

Key Messages

- Promoting gender equality and women's empowerment (GEWE) is associated with improvements in a variety of health and development outcomes.
- Many associations between GEWE interventions and improvements in health and development outcomes are cross-sectoral; therefore, the development community must work in more co-ordinated and integrated ways across multiple sectors.
- Further research and rigorous evaluation is needed to test different gendered interventions and identify more precisely the mechanisms by which they work and under what circumstances.

Introduction

This article presents evidence supporting the hypothesis that addressing gender equality and women's and girls' empowerment (GEWE) leads to better health and development outcomes. It comes in the wake of the new sustainable development agenda to end poverty by 2030, which includes a stand-alone goal on gender equality and the empowerment of women and girls, as well as gender sensitive targets in other goals (United Nations). Knowing the state of the evidence can help guide investments in development programmes and research. Additionally, it can help policy makers, programme implementers and researchers avoid doing unintentional harm, and inform the development community on how to accelerate and amplify the positive impacts of programmes.

There is a broad range of data from different contexts related to how addressing gender norms and inequalities impacts and accelerates health and development outcomes in and across many sectors (World Bank 2011; Swiss *et al.* 2012; Kabeer and Natali 2013; Blanc 2001; Ahmed *et al.* 2010). Many development experts assert, based on decades of research and programmatic experience, that the effects of interventions to address gender inequalities and to empower women and girls on sector outcomes generally are positive or at least neutral and avoid harm, and so are worth pursuing (Kraft *et al.* 2014). Both evidence and experience tell us that gender norms and inequalities are highly contextual, multifaceted and vary based on intersections with other social stratifiers, such as age, race, ethnicity, (dis)ability, income and education. Furthermore, gender norms present either as barriers or promoters for social and economic development.

To provide a more holistic view on this topic, we reviewed the literature and compiled rigorous, actionable evidence of the influence of GEWE variables on outcomes within six health and development sectors: family planning (FP), Maternal Newborn and Child Health (MNCH), nutrition, water sanitation and hygiene (WASH), financial services for the poor (FSP) and agriculture. The literature review within each sector was not systematic (Table 1). Instead, we sought to explore how different GEWE variables are operationalized within the literature and then examined the literature through the lens of these variables to identify clear patterns and associations.

It is useful to note that the six sectors were selected by a large donor organization, which sponsored the research as part of a critical examination of their current and future investments in GEWE. Similarly, in addition to gender equality, the sponsor requested a specific focus on women and girls, recognizing the need to level the playing field for women and girls as a prerequisite to achieving gender equality. The added focus on women and girls is not intended to diminish the critical importance of men's role in changing gender norms and achieving gender equality. Throughout the review, we define gender as a social construct that refers to relations between the sexes, based on their relative roles, encompassing the economic, political, and socio-cultural attributes, constraints and opportunities associated with being male or female; and varying across cultures and over time (USAID 2010).

Methodology

Study inclusion

Over a 4-week period in March to April 2014, our team of interdisciplinary gender researchers from the fields of public health (FP/reproductive health, nutrition, MNCH), economics and WASH searched online journal databases for peer-reviewed articles and reviewed the grey literature through funder clearinghouse websites, project websites and correspondence with sectoral experts. Online databases included Pubmed, GoogleScholar, Embase, Popline and Reproline. Governmental and non-governmental websites used included USAID, MEASURE DHS, World Health Organization (WHO), Johns Hopkins Bloomberg School of Public Health/Center for Communication Programs, Bill and Melinda Gates Foundation (BMGF), Alan Guttmacher Institute, Centers for Disease Control and Prevention (CDC), PATH and Global Health Council. We also utilized a 'snowball' sampling approach by identifying articles within collected reference lists. To identify relevant literature, we combined key words describing outcomes of interest within each sector with various combinations of GEWE search terms including gender, female, women and/or girls, AND/OR empowerment, agency, autonomy and status (additional detail on search terms is available upon request).

The inclusion criteria for the review focused on studies which: (1) were published in English and after the Year 2000; (2) analysed data/programmes from low- and middle-income countries; (3) researched the association between both individual- and community-level gender-based indicators as independent variables and health and development outcomes as dependent variables and (4) assessed changes in sector outcomes that could be directly attributable to and/or significantly associated with gender-based indicators. While we focused on the literature published after 2000, we also sought to place this analysis in the context of knowledge established prior to this timeframe (Panel 1).

Across the sectors, the studies included in this review varied in the strength of their design and analyses. Population-based studies rarely use a randomized controlled trial (RCT) study design, due to the broad ethical, financial and methodological constraints that exist in programmatic contexts outside controlled settings. Robust evaluations of gender interventions employing RCT and quasi-experimental designs are rare. Thus, we were able to find only a limited number of experimental and quasi-experimental studies focused on the relationship between GEWE variables and the outcomes of interest. These studies were, for the most part, found within the WASH and FSP sectors. In longitudinal analyses, women's

Table 1. Articles that met inclusion criteria by sector and gender-related lever

LEVER	Agriculture	Family planning	FSP	MNCH	Nutrition	WASH
Access to information	O'Sullivan *et al.* (2014)					Fakhri *et al.* (2012) Mason *et al.* (2013) Sommer *et al.* (2013) Tilley *et al.* (2013) Waterkeyn and Cairncross (2005) Waterkeyn and Waterkeyn (2013)
Community groups				Fantahun *et al.* (2007)	Smith *et al.* (2011)	O'Reilly (2010) Tilley *et al.* (2013) Waterkeyn and Cairncross (2005) Waterkeyn and Waterkeyn (2013)
Control over income/assets/ resources	O'Sullivan *et al.* (2014)	Corroon *et al.* (2014) Do and Kurimoto (2012)	Ashraf *et al.* (2010) Fafchamps *et al.* (2011) Karlan and Valdivia (2011) Kikulwe *et al.* (2014) Dupas and Robinson (2013) Karlan and Zinman (2011)	Corroon *et al.* (2014) Furuta and Salway (2006) Mistry *et al.* (2009) Singh et al. (2012)	Brunson *et al.* (2009) Pryer *et al.* (2003) Shroff *et al.* (2009) Shroff et al. (2011)	Fry *et al.* (2008 O'Reilly (2010 Tilley *et al.* (2013)
Decision-making power	Goldstein and Udry (2008)	Ahmed *et al.* (2010) Corroon *et al.* (2014) Hindin (2000) Pallitto and O'Campo (2005) Rahman *et al.* (2012) Saleem and Bobak (2005) Stephenson *et al.* (2012) Upadhyay and Karasek *et al.* (2012) Woldemicael (2009)		Ahmed *et al.* (2010) Allendorf (2007) Corroon *et al.* (2014) Fantahun *et al.* (2007) Fapohunda and Orobaton (2013) Furuta and Salway (2006) Hossain *et al.* (2007) Hou and Ma (2013) Mistry *et al.* (2009) Singh *et al.* (2012) Singh *et al.* (2015) Wado *et al.* (2014) Woldemicael and Tenkorange (2010)	Bhagowalia *et al.* (2012) Bose (2011) Brunson *et al.* (2009) Heaton etl al. (2008) Lepine and Strobl (2013) Pryer *et al.* (2003) Shroff et al. (2009) Shroff *et al.* (2011) Smith *et al.* (2003) Smith *et al.* (2011)	Fry *et al.* (2008) O'Reilly (2010) Tilley *et al.* (2013)
Education	O'Sullivan *et al.* (2014)	*A significant predictor for FP outcomes; therefore always controlled for in the literature.		Ahmed *et al.* (2010) Bloom *et al.* (2001) Fapohunda and Orobaton (2013) Furuta and Salway (2006) Hou and Ma (2013) Mistry *et al.* (2009) Singh *et al.* (2012) Singh *et al.* (2015) Wado *et al.* (2014) Woldemicael and Tenkorange (2010)	Abuya *et al.* (2012) Bhagowalia *et al.* (2012) Bose (2011) Shroff *et al.* (2009) Smith *et al.* (2011) Smith and Haddad (2000)	Mason *et al.* (2013) Sommer *et al.* (2013) Tilley *et al.* (2013)
Equitable interpersonal relationships		Corroon *et al.* (2014) Do and Kurimoto (2012) Pallitto and O'Campo (2005) Stephenson *et al.* (2012) Upadhyay and Karasek (2012) Woldemicael (2009)		Corroon *et al.* (2014) Fapohunda and Orobaton (2013) Furuta and Salway (2006) Singh *et al.* (2012) Singh *et al.* (2015)	Bhagowalia *et al.* (2012) Heaton *et al.* (2008) Pryer *et al.* (2003) Shroff *et al.* (2009) Shroff *et al.* (2011)	

continued

Table 1. Continued

LEVER	Agriculture	Family planning	FSP	MNCH	Nutrition	WASH
Mobility		Corroon *et al.* (2014)		Bloom *et al.* (2001)	Bhagowalia *et al.* (2012)	
		Saleem and Bobak (2005)		Corroon *et al.* (2014)	Bose (2011)	
				Hossain *et al.* (2007)	Shroff *et al.* (2009)	
				Mistry *et al.* (2009)	Shroff *et al.* (2011)	
				Woldemicael and Tenkorange (2010)		
Paid labour	O'Sullivan *et al.* (2014)			Fapohunda and Orobaton (2013)	Bose (2011)	
				Furuta and Salway (2006)	Pryer *et al.* (2003)	
				Hou and Ma (2013)	Smith *et al.* (2011)	
				Mistry *et al.* (2009)		
				Singh *et al.* (2012)		
				Woldemicael and Tenkorange (2010)		
Personal safety		Pallitto and O'Campo (2005)		Goo and Harlow (2012)	Ackerson and Subramanian (2008)	Tilley et al. (2013)
					Heaton *et al.* (2008)	
					Pryer *et al.* (2003)	
					Rahman *et al.* (2012)	
					Shroff *et al.* (2011)	
Rights	Goldstein and Udry (2008)	Pallitto and O'Campo (2005)				
		Upadhyay and Karasek (2012)				

empowerment levels, as well as the sector outcome of interest, are measured over time, either on a continuous basis or through two or more waves of data collection on the same population over time. These studies demonstrate a higher level of causal inference or directional effect; for example, between women's decision-making and their resulting FP use. Studies with multivariate analytic approaches based on cross-sectional data, that is, data collected at one point in time, are able to detect statistically significant independent associations for various gender factors with the outcomes studied. In these cross-sectional studies, however, the direction of the effect or causality cannot be inferred.

In the FP, MNCH and nutrition sectors, where the research on gender has been the most systematic and has been conducted over the longest periods of time, a specific process of study inclusion was used. If the data appeared sound [e.g. involved a well-drawn probability sample or a standard data source such as the Demographic and Health Survey (DHS)], then the methods were read. If the analysis also appeared sound (e.g. correct design and statistical analysis were applied, given the data used and questions being asked) and the research study used multivariate analysis and/or controlled for confounding and other factors using specific designs (e.g. case–control studies), then the study was kept. Study designs based on descriptive analyses that observed associations without controlling for other factors were the least robust, and were not included in our review of the FP, MNCH and nutrition sectors.

Two sectors presented particularities in available data that required adaptation in study inclusion criteria. First, in agriculture, we did not find literature that analysed gender-disaggregated, individual-level data; instead, the data were at the crop farm, plot or household levels. As a result, our discussion around agriculture and GEWE differs from the other sectors. Furthermore, there exist four seminal papers in the agriculture literature—three of which are well-vetted and comprehensive reviews that compile and interpret the literature, and the fourth is the first (and a very recent) large-scale study linking gender gaps with productivity outcomes (World Bank 2011; Food and Agriculture Organization of the United Nations 2011; Quisumbing *et al.* 2014; O'Sullivan *et al.* 2014). We did not attempt to reframe these experts' work by reinterpreting the original data from the studies cited in these compilations, but rather used the already identified themes as the base for our analysis. The FSP sector required adaptation for a different reason: our focus was on digital financial services (DFS), which is a relatively nascent sector in which we found little sex-disaggregated data to exist, and rigorous scientific research that examines gender is scarce. Therefore, we used our search criteria to also gather evidence in the wider non-digital FSP literature—with the caveat that what works in the traditional FSP sphere has not yet been proved to transfer to DFS. Despite the differences in these two sectors, we kept them in this review for three reasons: (1) their analysis was requested by the sponsor of the research; (2) they are emergent and dynamic sectors with large potential for gender gaps if not approached carefully; and (3) their inclusion demonstrates the range of ways in which GEWE must be examined across different sectors.

Once the literature was found and accepted, we performed a qualitative analysis across all sectors to identify recurrent patterns in the GEWE variables that were used in each article. We then classified these themes into what we call '*gender-related levers*' (Table 2). We use this term in recognition of the potential cross-sectoral impact of a given approach and because it reflects systems thinking, considering gender as part of a bigger system. Thus, gender-related levers can be identified and targeted during programme design and implementation as a way to amplify and accelerate achievement of health and development outcomes, and can be measured and evaluated accordingly. We sought to develop a clear taxonomy for the approaches used to empower women and girls, and put

Table 2. Gender-related levers and their operationalization

Gender-related lever	As operationalized in the literature
Access to information	Social and behavioural change campaigns
	Sector-specific education
Community groups	Women's advocacy groups
	Micro-credit and finance/savings groups
	Women's support groups
Control over income/ assets/resources	Control over money, seeds, land, wealth
	Conditional cash transfers (CCTs)/ social safety net
	Unconditional cash transfers, tax credits, vouchers
Decision-making power	Individual bargaining power
	Intra-household decision-making, including
	Constructive male engagement
	Community status and rights
	Representation (producer's associations, governance, local councils/boards)
	Head of household
	Freedom from asking permission
Education	School (traditional and non-traditional) enrolment
	Attainment
	Higher education
	Literacy
Equitable interpersonal relationships	Attitudes about GBV
	Couple communication
	Constructive male engagement
Mobility	Physical/actual mobility/freedom of movement
	Autonomous mobility
Paid labour	Time poverty
	Multiple roles
Personal safety	Experience of GBV
Rights	Legal rights (land, credit, identity cards); customary

those into language that would resonate with a public health audience of non-gender experts. In some cases, this search strategy may have resulted in under-representation of the breadth or depth of evidence for the lever if it was not fully captured initially by our gender search terms. For example, gender-based violence (GBV) (as part of the lever of personal safety) was likely underrepresented because, while we did search for gender, we did not search for terms specifically related to violence.

After generating the list of gender-related levers within each sector, we re-examined the literature and identified and analysed studies within our sample that informed the association of each lever with outcomes in that sector. We considered saturation of evidence to be met once clear patterns were established. For example, among the 15 articles related to MNCH that met our inclusion criteria, 13 showed a significant, positive correlation between decision-making power and MNCH outcomes. A final step in the analysis looked at the results across sectors, to identify which levers were found to be most often independently associated with multiple sector outcomes, with the goal of identifying potential cross-sectoral leverage points for interventions related to multiple sector outcomes.

Results

Levers

Across the 76 articles/compilations that met our search criteria and were included in the review, we identified a set of common GEWE variables that emerged repeatedly as significant predictors of sector outcomes. We grouped these indicators into 10 thematic categories, which we called 'gender-related levers' (Table 2). It is important to note that the levers in this list are overarching, intertwined and interrelated. Under each gender-related lever, we list ways in which empowerment was operationalized in the studies we were reviewing. The levers vary on a continuum of operationalization of the overarching concept: some are specific gender interventions themselves (e.g. community groups) whereas others are more conceptual and would require further operationalization to make them gender interventions (e.g. decision-making power). Therefore, the list serves as an initial 'framework' for deconstructing the elements of gender relations/norms that can influence health and development outcomes. Furthermore, we were interested in understanding the available evidence as a guide for future programming. Therefore, when possible, we isolated and analysed the factors that were used by each study to define and measure general constructs of 'female empowerment' or 'women's autonomy'. This taxonomy enabled us to draw conclusions about the strength of evidence for each gender lever within and across sectors.

Sector-specific findings

Family planning (FP)

Distribution of the literature vis-à-vis the gender-related levers.

A limited sample of ten FP articles met the inclusion criteria for this review. The research identified was restricted to observational studies using cross-sectional data and multivariate analyses (and in one case, multilevel modelling). None of the studies reviewed for FP claimed a causal relationship between a gender-related lever and a FP outcome. However, significant associations were found between six of the ten gender-related levers and FP outcomes (Table 3).

Findings

The strongest evidence of a positive relationship was that women with higher levels of decision-making power are more likely to have ever used modern methods of contraception and less likely to have an unplanned pregnancy. The studies were geographically dispersed across sub-Saharan Africa, South Asia, South America and a meta-analysis spanned 31 countries.

The evidence for an association between equitable interpersonal relationships and FP outcomes (contraceptive use, unplanned pregnancy, desired family size) was less robust in terms of geographic variation and odds ratio results, but still strong enough to assert that this is an important lever for women (Stephenson *et al.* 2012). Use of DHS survey data to measure equitable interpersonal relationships in Africa, however, yielded inconsistent results. A study in four sub-Saharan African countries, for instance, found that in Namibia and Zambia, women reporting equitable interpersonal relationships were more likely to have a higher number of children than desired; and Eritrean women who expressed no tolerance for wife-beating—an operationalization of equitable interpersonal relationships (see Table 2)—were less likely to have ever used contraception (Upadhyay and Karasek 2012; Woldemicael 2009). These counterintuitive results have been reported elsewhere in the literature when studies in Africa relied on DHS measures of autonomy and women's empowerment. Experts recommend that the indicators, which were developed and tested in the South Asian context, be modified and tested thoroughly in Africa to ensure valid results (Singh *et al.* 2015).

The literature discussing mobility, generally defined as freedom of movement, and FP outcomes supports the importance of this gender-related lever as well, although evidence was weaker and the

Table 3. Summary of studies in family planning (FP)

Article	Location	Type of study/ analysis	Gender-related LEVER(s)*	Gender variable operationalized	Sector outcome
Ahmed *et al.* (2010)	31 Countries	• Meta analysis random effects model: pooled data multivariate model	• DMP	Combined index of 5 items relating to household decision-making	Contraceptive use
Corroon *et al.* (2014)	Urban Nigeria	• Observational/Cross-sectional • Multivariate analysis	• Control over income/ assets/resoures • DMP • EIR • Mobility	Factor analyses for each domain: resulting latent variables used in models	Contraceptive use
Do and Kurimoto (2012)	Namibia, Ghana, Zambia, Uganda	• Observational/Cross-sectional • Multivariate analysis	• Control over income/assets/ resources • EIR	Principle components analysis of 5 items	Contraceptive use
Hindin (2000)	Zimbabwe	• Observational/Cross-sectional • Multivariate analysis	• DMP	For each decision-making domain, 1 variable put into models	Contraceptive use; wife's approval of couples using FP; Intention to use modern FP; Desired # of children
Pallitto and O'Campo (2005)	Columbia	• Observational/Cross-sectional • Multivariate analysis and multilevel modeling	• DMP • EIR • Personal safety • Rights	Community-level patriarchy score based on male attitudes about patriarchy	Unintended pregnancy
Rahman et al. (2012)	Bangladesh	• Observational/Cross-sectional • Multivariate analysis	• DMP	Index based answers to 5 items	Unintended pregnancy
Saleem and Bobak (2005)	Pakistan	• Observational/Cross-sectional • Multivariate analysis	• DMP • Mobility	Weighted indexes for both levers, tested with Cronbach's α	Contraceptive use
Stephenson *et al.* (2012)	Ehtiopia, Kenya	• Observational/Cross-sectional • Multivariate analysis	• DMP • EIR	Adapted versions of the Gender Equitable Men and Sexual and Reproductive power scales	Contraceptive use
Upadhyay and Karasek (2012)	Guinea, Namibia, Mali, Zambia	• Observational/Cross-sectional • Multivariate analysis	• DMP • EIR • Rights (refusal to have sex)	Women classified based on the answers to a set of items in their respective areas	Desired fertility (ideal number of children)
Woldemicael (2009)	Eritrea	• Observational/Cross-sectional • Multivariate analysis	• DMP • EIR • Mobility	Single items on different decisions, attitudes about domestic violence derived from 5 items	Contraceptive use, desired family size, desire for no more children

*DMP, decision-making power; EIR, equitable interpersonal relationships.

strength of the association appears to be context specific. In Nigeria, women reporting more freedom of mobility were 6% more likely to use a modern method of FP, whereas Pakistani women with more mobility were 54% more likely to have ever used contraception (Corroon *et al.* 2014; Saleem and Bobak 2005). Woldemicael's (2009) study of Eritrean women found that those with less freedom of movement were 25% less likely to have ever used contraception. During the 1990s, numerous studies documented mobility as one of the strongest and most consistent factors of women's empowerment that was associated with FP (and MNCH) outcomes (Panel 1) (Balk 1994; Dharmalingam and Philip Morgan 1996; Schuler and Hashemi 1994; Cleland *et al.* 1996; Bloom *et al.* 1999). Thus, though not explored as widely in studies taking place from 2000 on, mobility in South Asia has demonstrated a strong, positive relationship with FP outcomes.

The two articles addressing control over income/assets/resources were inconclusive, although this lever overlaps with decision-making power. In urban Nigeria, women with access to money were 16% more likely to use modern contraceptive methods (Corroon *et al.* 2014). However, association of control over income—as one component of an empowerment index applied in four countries in Africa—with FP outcomes varied by country (Do and Kurimoto 2012).

Only two articles in the reviewed literature found rights the lever to predict FP outcomes (Upadhyay and Karasek 2012; Pallitto and O'Campo 2005). The paucity of information on this lever does not diminish the importance of rights on FP outcomes; logic and experience tell us that if women do not have a legal right to use contraception without their husband's permission, for example, the demand for FP services will be reduced. Studies on GBV and reproductive health (RH) have shown that women who experience GBV are less likely to be able to control their fertility (Campbell 2002; Heise *et al.* 1999). Likewise, access to information, paid labour and participation in community groups are gender-related levers that were thoroughly explored in the literature pre-2000 (Panel 1), and so, they were less likely to show up using our inclusion criteria for this review. Finally, education has been shown repeatedly to be a strong predictor for FP outcomes. As a result, it is always controlled for in the literature and therefore taken for granted.

Maternal, newborn and child health (MNCH)

Distribution of the literature vis-à-vis the gender-related levers

Overall, the fifteen articles reviewed for MNCH addressed eight of the ten levers, with good coverage of six of those levers. These studies were largely focused on either maternal health (MH) (Table 4) or newborn and child health—from here forward referred to as simply CH (Table 5); only two articles addressed both MH and CH (Singh *et al.* 2015; Allendorf 2007). None of the studies reviewed for MNCH claimed a causal relationship between a gender-related lever and an MNCH outcome; all claimed statistically significant associations. Most of the articles described observational studies using cross-sectional data based on a probability sample.

Findings

The most robust results were found for the associations between decision-making power and MH and CH outcomes, followed closely by education. The study sites included countries in South Asia and sub-Saharan Africa, but the literature also included a meta-analysis of data from 31 countries.

Decision-making power was positively and significantly associated with a range of MH outcomes: antenatal and postnatal care visits; the presence of a skilled or any attendant at delivery; obtaining a tetanus toxoid vaccine during pregnancy; and the likelihood of an institutional delivery. In contrast, two studies were found to have no significant association between women with high decision-making power and the likelihood they will give birth in a health facility (Singh *et al.* 2015; Hou and Ma 2013). In the CH literature, higher levels of decision-making power among women were positively and significantly associated with the likelihood of vaccinating their children, seeking treatment for a child sick with an acute respiratory infection (ARI), and lower probability of having a child die before age five (Singh *et al.* 2015; Allendorf 2007; Fantahun *et al.* 2007; Hossain *et al.* 2007; Wado *et al.* 2014).

The findings for education were positive and significant as well, with good coverage in the literature for both MH and CH. Mothers' level of education was positively and significantly associated with antenatal care visits, having a skilled or any attendant at delivery, and delivering in a facility. Similarly, mothers' level of education was positively and significantly associated with improved CH outcomes, including vaccinations and seeking treatment for ARI in studies from Africa. One exception was found in Bangladesh, where the data showed no significant association between mothers' education and neonatal, postnatal or child mortality, but a strong and significant association between fathers' education and infant or child death; compared with fathers with no education, those with at least a primary education were half as likely to experience an infant or child death (Hossain *et al.* 2007).

Paid labour appeared as a statistically significant gender lever in the MH literature, but was not addressed in the reviewed CH studies. The findings in the MH literature were mixed, however, and research from South Asia found a negative association between paid labour and MH outcomes. In Nigeria, two studies found paid labour positively associated with MH outcomes: working women were 3% less likely to deliver alone and 26% more likely to deliver in a facility (Fapohunda and Orobaton 2013; Singh *et al.* 2012). On the other hand, in Pakistan, paid labour was significantly and negatively associated with prenatal care (OR = 0.79) and institutional births (OR = 0.72), which may reflect the fact that women who work in Pakistan are also likely to be very poor and still lack access to care despite their earnings (Hou and Ma 2013). Similarly, in India, paid labour was significantly associated with a risk of not delivering in an institution (OR = 0.76) (Mistry *et al.* 2009).

In the MH literature, the relationships between equitable interpersonal relationships and having a skilled attendant at delivery (e.g. an institutional delivery) and antenatal care were positive and statistically significant, but less robust than decision-making power, education or paid labour. Only one study addressed equitable interpersonal relationships and CH outcomes. The review of DHS data from eight countries in Africa found that women who expressed intolerance for wife-beating were 10% more likely to deliver in a facility compared with women expressing tolerance and 27% more likely to have fully vaccinated children (Singh *et al.* 2015). Results from other studies reviewed showed 11–34% higher associations of equitable interpersonal relationships with a variety of beneficial MH outcomes (Singh *et al.* 2015; Corroon *et al.* 2014; Fapohunda and Orobaton 2013; Singh *et al.* 2012; Furuta and Salway 2006).

Similarly, the findings for mobility were largely from the MH literature (four articles), with only one study looking at its relationship with CH (Woldemicael 2009; Corroon *et al.* 2014; Hossain *et al.* 2007; Mistry *et al.* 2009; Bloom *et al.* 2001). The association was statistically significant and positive between mobility and having a skilled attendant at delivery in one study from India (OR = 3.07), whereas the significant positive associations in the other studies

Table 4. Summary of studies in MNCH (Maternal Health)

Article	Location	Type of study/analysis	Gender-related Lever(s)*	Gender variable operationalized	Sector outcome
Ahmed *et al.* (2010)	31 Countries	• Meta-analysis	• DMP • Education	Education: complete primary versus not complete/none; DMP: summed index of 5 questions from DHS	ANC utilization (4+ visits) and skilled attendant at delivery
Allendorf (2007)	Nepal	• Observational/Cross-sectional • Multivariate analysis	• DMP	Index based on 4 DMP items re: health-care service utilization	ANC, tetanus toxoid vaccine, skilled attendant at delivery
Bloom *et al.* (2001)	Varanasi, Uttar Pradesh, India	• Observational/Cross-sectional • Multivariate analysis	• Education • Mobility	Mobility: index of four items, Education: years of schooling	ANC utilization (based on a scale reflecting content and frequency of care), skilled attendant at delivery
Corroon *et al.* (2014)	Urban Nigeria	• Observational/Cross-sectional • Multivariate analysis	• Control over income/assets/resources • DMP • EIR • Mobility	EIR: zero tolerance for domestic violence based on 7 items; mobility based on 6 items; DMP: based on 4 items; control over assets based on 2 items	Skilled attendant at delivery, institutional delivery
Fapohunda and Orobaton (2013)	Nigeria	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education • EIR • Paid labour	Decision-making: index of 6 items classified if women have full or partial say in all six, or not; EIR: 4 items; Ed: none, some/completed primary, some/completed secondary or more; Paid labour: working vs not	No one present at delivery (versus anyone, skilled or not)
Furuta and Salway (2006)	Nepal	• Observational/Cross-sectional • Multivariate analysis	• Control over income/assets/resources • DMP • Education • EIR • Paid labour	Paid labour/control over finances was one variable Education: none, primary, secondary+ was controlled for but results not shown.	Skilled antenatal care, skilled care at delivery
Goo and Harlow (2012)	Kenya	• Observational/Cross-sectional • Multivariate analysis	• Personal Safety	IPV: Ever physical violence per the DHS variables, Ever physical violence, Ever emotional violence	Skilled care at delivery
Hou and Ma (2013)	Pakistan	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education • Paid Labour	Weighted index to create high and low DMP. Education: classes 1–5,–8, 9–10, 11+	ANC, institutional birth, skilled birth attendance and postnatal care
Mistry *et al.* (2009)	India	• Observational/Cross-sectional • Multivariate analysis	• Control over income/assets/resources • DMP • Education • Mobility • Paid labour	Index of decision-making composite measure (Cronbach's $\alpha = 0.79$); mobility index ($\alpha = 0.77$), control over assets a single question; education: years of education; employed yes or no	ANC, institutional delivery, skilled attendant at delivery, postnatal care
Singh *et al.* (2015)	DRC, Egypt, Ghana, Nigeria, Liberia, Mali, Uganda, Zambia	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education • EIR	Decision-making: index of 4 items; EIR based on zero tolerance for wife-beating- index of 5 items	Facility delivery

continued

Table 4. Continued

Article	Location	Type of study/analysis	Gender-related Lever(s)*	Gender variable operationalized	Sector outcome
Singh *et al.* (2012)	Nigeria	• Observational/Cross-sectional • Multivariate analysis	• Control over income/assets/resources • DMP • Education • EIR • Paid labour	Decision-making: index of 4 items; control over finances: one item; EIR: zero tolerance of wife beating based on 5 items, and wives being able to refuse sex with their husbands Education: levels (primary, secondary+)	Institutional delivery
Woldemicael and Tenkorang (2010)	Ethiopia	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education • Mobility • Paid labour	Autonomy: single latent variable based on exploratory factor analysis of Decision-making and mobility; Education (some versus none); Paid labour: working versus not working	Maternal health seeking behavior: combination of tetanus immunization, ANC and institutional delivery

*DMP, decision-making power; EIR, equitable interpersonal relationships; ANC, antenatal care.

ranged between OR = 1.08 and 1.46 for outcomes including institutional delivery, skilled attendant at delivery, and antenatal and postnatal care (Woldemicael 2009; Corroon *et al.* 2014; Mistry *et al.* 2009; Bloom *et al.* 2001).

Control over income/assets/resources appeared as a gender-related lever in four of the MH studies. Results showed a statistically significant and positive association with institutional delivery, antenatal care and prenatal care (Corroon *et al.* 2014; Singh *et al.* 2012; Mistry *et al.* 2009; Furuta and Salway 2006).

Nutrition

Distribution of the literature vis-à-vis the gender-related levers

The sample of fourteen articles addressing gender empowerment and nutrition included eight of the ten levers (Table 6). Of the fourteen articles, eight constructed an index to represent women's autonomy/empowerment. Each of these indices was created based on a form of factor analysis and was comprised of different components of women's empowerment. Therefore, in two instances, it is difficult to parse out which levers were most influential in the resulting nutritional outcomes (Bose 2011; Brunson *et al.* 2009).

None of the studies claimed a causal relationship between the gender levers and nutrition outcomes; all claimed statistically significant associations. Most of the articles described observational studies using cross-sectional data based on a probability sample. Also, the research studies were in large part conducted in South Asia—specifically, Bangladesh and India; however, three studies were conducted in sub-Saharan Africa, one study was conducted in Latin America, and two studies were meta-analyses across many countries in the aforementioned regions.

Findings

Overall, we find the strongest evidence of a positive relationship between two levers—decision-making power and education—and nutrition outcomes. Decision-making power was addressed in ten of the fourteen articles and found to have a significant relationship with nutrition in seven of them (Bose 2011; Brunson *et al.* 2009; Lepine and Strobl 2013; Pryer *et al.* 2003; Shroff *et al.* 2011; Smith *et al.* 2003; Smith *et al.* 2011; Bhagowalia et al 2012; Shroff *et al.* 2009; Heaton and Forste 2008). In these seven articles, multivariate analyses support the hypothesis that women with higher levels of decision-making power are more likely to have a child with improved nutritional status and less likely to experience child stunting (Bose 2011; Brunson *et al.* 2009; Lepine and Strobl 2013; Pryer *et al.* 2003; Shroff *et al.* 2011; Smith *et al.* 2003; Smith *et al.* 2011). In the two articles, where it was found to be insignificant, it appears that woman's decision-making power did not extend to decisions that would influence her child's nutritional status (Shroff *et al.* 2011; Bhagowalia *et al.* 2012).

Also, the evidence shows a strong negative association between women's educational status and child malnutrition/stunting (Bose 2011; Smith *et al.* 2011; Bhagowalia *et al.* 2012; Abuya *et al.* 2012; Smith and Haddad 2000). Maternal literacy, specifically, was found to be a significant indicator for child stunting and malnutrition in two articles (Bose 2011; Smith *et al.* 2011). One study in India provides an exception, finding no significant relationship between a mother's educational level and child stunting when autonomy indicators and socioeconomic status were controlled for in the analysis (Shroff *et al.* 2009).

The evidence for an association between mobility (operationalized as freedom of movement) (Bose 2011; Shroff *et al.* 2011; Bhagowalia *et al.* 2012; Shroff *et al.* 2009), paid labour (Bose 2011; Pryer *et al.* 2003; Smith *et al.* 2011), and control over income/

Table 5. Summary of studies in MNCH (Newborn and Child Health)

Article	Location	Type of study/analysis	Gender-related Lever(s)*	Gender variable operationalized	Sector outcome
Allendorf (2007)	Nepal	• Observational/Cross-sectional • Multivariate analysis	• DMP	Index based on 4 decision-making items re: health-care service utilization	Vaccination
Fantahun *et al.* (2007)	Ethiopia	• Prospective case-control study, multivariate analysis	• Community groups (social capital) • DMP	Social capital index: divided into low-med-high based on 5 items; Decision-making index: divided into low- and high- based on 4 items	Under-5 mortality
Hossain *et al.* (2007)	Bangladesh	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education • Mobility	Indexes with 4 items pertaining to HH decision-making; mobility index was 5 items; Education=years of schooling	Neonatal, infant and child mortality
Singh *et al.* (2015)	DRC, Egypt, Ghana, Nigeria, Liberia, Mali, Uganda, Zambia	• Observational/Cross-sectional • Multivariate meta-analysis	• DMP • Education • EIR	Decision-making: index of 4 items. EIRs based on zero tolerance for wife-beating- index of 5 items; Education: none, primary, secondary+	Service utilization for ARI Infection, immunization
Wado *et al.* (2014)	Ethiopia	• Observational/Cross-sectional • Multivariate analysis	• DMP • Education	Education: none, primary, secondary +; decision-making: composite index	Child vaccination

*DMP, decision-making power; EIR, equitable interpersonal relationships.

assets/resources (Brunson *et al.* 2009; Shroff *et al.* 2011; Bhagowalia *et al.* 2012; Shroff *et al.* 2009) was strong enough to assert that these are important levers for both a mother's nutritional status as well as her children's. Personal safety, in the form of GBV, was addressed in five articles, but only found to have a significant relationship with nutritional outcomes [maternal body mass index (BMI), anaemia, child stunting and child BMI] in three of them (Pryer *et al.* 2003; Shroff *et al.* 2011; Heaton and Forste 2008; Rahman *et al.* 2012; Ackerson and Subramanian 2008). Interestingly, equitable interpersonal relationships—in the form of maternal attitudes towards domestic violence—was only addressed in the South Asian context (Pryer *et al.* 2003). In Bangladesh, it was found to be significantly associated with child stunting and maternal BMI; whereas, in the two articles based in India, there was no significant relationship found (Pryer *et al.* 2003; Shroff *et al.* 2011; Bhagowalia *et al.* 2012; Shroff *et al.* 2009). The reason for this non-significance could be indicative of the normative nature of violence that is experienced and thus accepted by women in many parts of India (Shroff *et al.* 2011; Shroff *et al.* 2009). In a study focused on five countries in Latin America, equitable interpersonal relationships was operationalized as the presence of controlling male behaviour in the household and was found to be significantly correlated with low child nutritional status (Heaton and Forste 2008).

One article found a significant negative correlation between a woman's participation in community groups and child stunting (Smith *et al.* 2011). As described in Panel 1, several articles demonstrate the importance of the lever 'access to (nutrition) information' as a significant correlate to child nutrition outcomes; however, the majority of this literature was published pre-2000 and, therefore, did not fall within our search criteria.

Water, sanitation and hygiene (WASH)

Distribution of the literature vis-à-vis the gender-related levers

The inclusion criteria used in this review of WASH research captured only eight peer-reviewed articles that spanned across six of the ten levers (Table 7). None of the articles claimed a causal relationship between a gender-related lever and a WASH outcome. The main finding for WASH is the dearth of peer-reviewed literature post-2000 that presents robust evidence of the interactions between GEWE and WASH outcomes.

In recognition of the available literature's limitations, we included two literature reviews (Tilley *et al.* 2013; Sommer *et al.* 2013). The literature reviews provided ethnographically oriented insights on two GEWE levers: personal safety and education. For WASH, as for FSP (below), much of the existing research describes the associations between WASH interventions and GEWE outcomes, rather than the focus of this report: GEWE interventions and WASH outcomes.

Findings

The small number of studies reviewed provided limited evidence that access to information for women and girls is associated with both improved menstrual hygiene management (MHM) outcomes and an increase in safe sanitation practices (Tilley *et al.* 2013; Sommer *et al.* 2013; Fakhri *et al.* 2012; Mason *et al.* 2013; Waterkeyn and Cairncross 2005; Waterkeyn and Waterkeyn 2013). For MHM outcomes, for example, Fakhri *et al.* (2012) found a statistically significant ($P = 0.002$), positive association between access to information and MHM behaviours during menstruation (usual bathing and washing of genitals after urinating). Qualitative results from Kenya also suggest a positive association

Table 6. Summary of studies in nutrition

Article	Location	Type of study/Analysis	Gender-related lever(s)*	Gender variable operationalized	Sector outcome
Abuya *et al*. (2012)	Nairobi	• Observational/ Cross-sectional • Multivariate analysis	• Education	Education: Primary and below; Secondary and above	Stunting: height-for-age z-scores (HAZ)
Ackerson and Subramanian (2008)	India	• Observational/ Cross-sectional • Multivariate analysis	• Personal Safety	Self-reported physical domestic violence: Never, more than 1 year ago; once in past year; more than once in past yr.	Women: Any & severe anemia; any and sever under-weight: BMI; Children: anemia, stunting (HAZ), weight for height, weight for age, BMI
Bhagowalia *et al*. (2012)	Bangladesh	• Observational/ Cross-sectional • Multivariate analysis	• DMP • Education • EIR • Mobility	Female empowerment indices: principle-component analysis of questions re: mobility, DMP, and attitudes re: violence; Education: Primary, Secondary, Higher	Child nutrition: Stunting (HAZ)
Bose (2011)	India	• Observational/ Cross-sectional • Multivariate analysis	• DMP • Education • MobilityPaid Labour	Education: years of education Autonomy Index: constructed from principal component analysis (PCA) (Cronbach's $\alpha = 0.73$) based on 7 DHS questions- 4 related to DMP and 3 related to freedom of movement Mother works: yes or no	Nutritional allocation: duration of breastfeeding, supplemental feeding Malnutrition: WA
Brunson *et al*. (2009)	Kenya	• Observational/ Cross-sectional • Multilevel analysis	• Control over income/ assets/resources • DMP	Autonomy Index: constructed from PCA of 11 item culture-specific questionnaire (Cronbach's $\alpha = 0.83$)	Child nutrition: weight for height Z-scores
Heaton and Forste (2008)	• Colombia • Peru • Haiti • Nicaragua • Bolivia	• Observational/ Cross-sectional • Multivariate analysis	• DMP • EIR • Personal Safety	Couple interaction: husband demonstrated controlling behavior (α constructed from 15 dichotomous indicators); violence (9 indicators); female DMP (9 indicators) and joint DMP (9 indicators)	Child malnutrition (Height for age *z*-score)
Lepine and Strobl (2013)	Senegal	• Observational/ Cross-sectional • Multivariate analysis with us of instrumental variable to control for endogeneity	• DMP	Bargaining Power: Household DMP Instrument: ethnicity	Child Nutritional Status: Mid-Upper Arm Circumference (MUAC)
Pryer *et al*. (2003)	Bangladesh	Mixed method • Qualitative • Longitudinal Panel Survey	• Control over income/ assets/resources • DMP • EIR • Paid Labour	Women's Autonomy and Control in Household based on index of: Financial Status; Workdays off due to illness/mo; workdays/mo; HOH; Ideal # of	Adult Female nutritional Status: based on BMI

continued

Table 6. Continued

Article	Location	Type of study/Analysis	Gender-related lever(s)*	Gender variable operationalized	Sector outcome
			• Personal Safety	children; Violence in home against woman; Husband gives money to wife; Budget manager; Marital status	
Rahman *et al.* (2012)	Bangladesh	• Observational/ Cross-sectional • Multivariate analysis	• Personal Safety	Intimate Partner Violence (IPV) in prior year: No IPV; any physical or sexual IPV; physical IPV only; sexual IPV only; and both physical and sexual IPV	Child nutritional status: stunting (high for age); wasting (weight for height); underweight (weight for age)
Shroff *et al.* (2011)	India	• Observational/ Cross-sectional • Multivariate analysis	• Control over income/ assets/resources • DMP • EIR • Mobility • Personal Safety	Autonomy based on confirmatory factor analysis of 1) HH DMP 2) Child-related DMP 3) Financial independence 4) Mobility autonomy 5) Actual mobility 6) Non-acceptance of domestic violence 7)DV	Infant feeding & Infant growth: length-for-age (LAZ), weight-for-age (WAZ), weight-for-length (WLZ)
Shroff *et al.* (2009)	India	• Observational/ Cross-sectional • Multivariate analysis	• Control over income/ assets/resources • DMP • Education • EIR • Mobility	Maternal Autonomy constructed based on: DMP; permission to travel; attitude about DV; financial autonomy; Education: none, primary, secondary plus	Child Stunting: height-for-age *z*-score
Smith *et al.* (2011)	Bangladesh	• Impact Evaluation • Triangulation of non-experimental & quasi-experi-mental data sources; Propensity score	• Community Group • DMP • Education • Paid labour	Empowerment Intervention: focused on improving involvement in major decisions, cash earning, school attendance, and literacy	Child Stunting: height-for-age *z*-scores
Smith *et al.* (2003)	36 countries in South Asia (SA), Sub-Saharan Africa (SSA), & LatinAmerica and the Caribbean (LAC).	• Observational/Cross-sectional • Multivariate, fixed effects regression	• DMP	DMP based on factor analysis of 4 dimensions of decisionmaking	Child weight for age *z*-score (WAZ); height for age (HAZ); Weight for height *z*-score (WHZ
Smith and Haddad (2000)	63 Developing countries	• Longitudinal • Fixed effects ordinary least squares regression	• Education	Female gross secondary school enrollment rates	Prevalence of under 5-child WAZ

*DMP, decision-making power; EIR, equitable interpersonal relationships.

Table 7. Summary of studies in Water, Sanitation, and Hygiene (WASH)

Article	Location	Type of study/analysis	Gender-related lever(s)*	Gender variable operationalized	Sector outcome
Fakhri *et al.* (2012)	Iran	Quasi-experimental	• Access to information	Health intervention program: 10 two-hour education sessions	Menstrual hygiene management (MHM) behaviours
Fry *et al.* (2008)	International	Cross-sectional, multivariate analysis	• Control over income/assets/resources • DMP	Gender empowerment measure based on male/female % shares on 4 items	Sanitation coverage
Mason *et al.* (2013)	Kenya	Ethnographic, qualitative analysis	• Access to information • Education	MHM supplies and education provided to girls in school	MHM in schools
O'Reilly (2010)	India	Ethnographic, qualitative analysis	• Community Groups • Control over income/assets/resources • DMP	Targeting of women as latrine purchasers, users, and marketers	Latrine coverage
Sommer *et al.* (2013)	International	Literature review	• Access to information • Education	Gaps in girls' menstrual knowledge	MHM Behaviours
Tilley *et al.* (2013)	International	Literature review	• Access to information • Community groups • Control over income/assets/resources • DMP • Education • Personal Safety		Sanitation
Waterkeyn and Cairncross (2005).	Zimbabwe (Tsolotsho and Makoni districts)	Quasi-experimental	• Access to information • Community groups	Health trainings to influence behavior change	Sanitation
Waterkeyn and Waterkeyn (2013)	Zimbabwe (Tsolotsho, Gutu and Makoni districts)	Quasi-experimental	• Access to information • Community groups	Health trainings to influence behavior change	Sanitation

*DMP, decision-making power; MHM, menstrual hygiene management.

between access to information and MHM outcomes (Mason *et al.* 2013).

Four articles showed significant relationships between involvement in community groups and WASH outcomes (Tilley *et al.* 2013; Waterkeyn and Cairncross 2005; Waterkeyn and Waterkeyn 2013; O'Reilly 2010). For example, Waterkeyn and Cairncross (2005) found a statistically significant difference between community health club members and control groups in two Zimbabwean districts for both burying faeces (e.g. 'cat' sanitation, $P < 0.0001$) and latrine construction ($P < 0.0001$) (Waterkeyn and Cairncross 2005). This study centred on the use of community groups to educate members about safe hygienic behaviours. In 2013, Waterkeyn and Waterkeyn (2013) further documented how community groups valued the opportunity to apply their knowledge (which they valued even more than income generation) to change sanitation-related behaviours. Group members engaged in less open defecation (7 vs. 41% in the control), practiced faeces burial (34% vs. 14% in the control) and more members had 'VIP latrines' (54% vs. 43% in the control); however, no tests for significance were conducted (Waterkeyn and Waterkeyn 2013).

Three articles discussed control over income/assets/resources as a gender-related lever for sanitation coverage (Tilley *et al.* 2013; O'Reilly 2010; Fry *et al.* 2008), and two of these articles included decision-making power (Tilley *et al.* 2013; O'Reilly 2010). These studies present mixed evidence. For example, one analysis of global data found that female empowerment—which included women's representation in decision-making positions and relative earned income—explained a significant portion of the variance (11–18%) in sanitation coverage, independent of other indicators (Fry *et al.* 2008). Another article found that efforts to increase latrine coverage by empowering women through control over assets, decision-making power and engaging women's community groups led to unintended consequences (such as decreased socialization opportunities) (O'Reilly 2010). While the ethnographic methods used in the latter study do not allow for assessments of statistical significance or association, the author raises concern about conflicting project goals and the failure to adequately address social norms and gendered inequalities.

Agriculture

Distribution of the literature vis-à-vis the gender-related levers

We took a different approach reviewing the literature in the agriculture sector. At the advice of sector experts, we focused on recent, comprehensive, and well-vetted compilations and studies that condense and interpret the existing literature (Table 8). Given the rigorous way in which the evidence has been reviewed and interpreted in these source documents, we did not attempt to further interpret the original data. Rather, we summarize and organize the findings across these documents according to the gender-related levers. In general, other than studies on gender and land rights/tenure, we note a lack of literature that would meet the inclusion criteria that was used for the other sectors (O'Sullivan *et al.* 2014). The relative paucity of peer-reviewed literature about gender and agriculture

Table 8. Summary of studies in agriculture (AG)

Article	Location	Type of study/analysis	Gender-related lever(s)*	Gender variable operationalized	Sector outcome
Goldstein and Udry (2008)	Ghana	• Econometric modelling, productivity estimations	• DMP • Rights	Positions of power and land tenure rights	Agricultural productivity
O'Sullivan et al. (2014)	EthiopiaMalawiNiger NigeriaTanzaniaUganda	• Oaxaca-Blinder decomposition for linear regression models	• Access to information • Community groups • Control over income/ assets/resources • DMP • Education • Paid labour • Rights	Sex differences in labour and non-labour inputs, extension and information, land, access to markers, human capital, access to land/tenure security	Agricultural productivity
World Bank (2011) (*World Development Report 2012*)	International	• Compilation—white papers, literature review			
Food and Agriculture Organization of the United Nations (2011)	International	• Compilation—white papers, literature review	• Access to information • Community groups • Education • Rights		Gender gaps in productive resources and opportunities in agriculture
Quisumbing et al. (2014)	International	• Book. Compilation—white papers, literature review			

*DMP, decision-making power; EIR, equitable interpersonal relationships.

reflects the measurement challenges the sector faces as it attempts to rigorously examine, which interventions directly influence agricultural productivity.

Unlike health outcomes, the unit of analysis for agricultural productivity outcomes is often the farm, household, or plot; individual-level data that can be sex-disaggregated is not routinely or easily collected, making it difficult to identify gender gaps and perform gender analysis (Doss 2014a). Much of what we know about gender differences in agricultural productivity comes from comparisons of outcomes in female-headed households (or farms) versus male-headed households (or farms), instead of comparisons between female and male farmers within one household. Data about gender differences in agriculture based on head of household comparisons are not necessarily representative of intra-household patterns or of how other males and females within a household make decisions about, contribute to, and benefit from farming in different ways. Additionally, since both men and women may work on the same crop at different points or in different capacities during the production cycle, it is difficult to precisely attribute yield; to one sex or the other (Doss 2014b).

Findings

The literature strongly reaffirms that women play essential roles in agriculture, comprising an average 43% of the agricultural labour force globally and 49% in sub-Saharan Africa (Food and Agriculture Organization of the United Nations 2011). These roles vary across regions and contexts, however, and even more widely across specific crops and activities (Food and Agriculture Organization of the United Nations 2011). Other key findings and points of consensus include the following:

1. There are significant gender gaps in access to productive resources and opportunities Food and Agriculture Organization of the United Nations 2011).
2. Closing the gender productivity gap would have major, positive implications for agriculture, food security and development. Giving women the same access to productive resources as men could increase farm yields by up to 30%, which could in turn raise total agricultural output in developing countries by up to 4% and reduce the number of hungry people in the world by up to 17% (Food and Agriculture Organization of the United Nations 2011).
3. Until recently, most literature assumed that closing the gendered access gaps to inputs would close the productivity gap accordingly. Recent research utilizing plot-level data analysed the link between access to inputs and productivity; they found significant gender gaps in returns, suggesting there are additional gender barriers that must be overcome to maximize effective use of these inputs to achieve equal productivity (O'Sullivan *et al.* 2014).
4. Closing the gender productivity gap may not necessarily achieve the desired development outcome (such as increased consumption, nutrition and income) without complementary interventions to remove underlying gender barriers. Studies from agriculture and other sectors like nutrition and health provide evidence that having increased access to income and food does not necessarily mean that females and males will have equal control over or benefit equally from these resources (World Bank 2011; Udry *et al.* 1995; Quisumbing 2003).

The literature identifies strong gender gaps associated with decision-making power, in the form of representation; community

groups with decision-making power, in the form of representation and community groups. (Food and Agriculture Organization of the United Nations 2011). In the documents reviewed, two studies found statistically significant relationships between agricultural productivity outcomes and the gender-related levers: control over assets/resources/income; rights; decision-making power; paid labour; and access to information and education (O'Sullivan *et al.* 2014; Goldstein and Udry 2008). One of the most broadly documented gender gaps in the category of control over assets/resources/income is women's access to agricultural technology, or non-labour inputs. *Levelling the Field* finds that women have unequal access to these productive inputs on a large scale, and even when they do have access, they use them differently and receive unequal returns. For example, in Ethiopia and Tanzania, female farmers were found to be using lower-quality fertilizer than men, or applying it incorrectly or at the wrong time (O'Sullivan *et al.* 2014). The report also finds that women in Ethiopia benefit—in terms of agricultural productivity—significantly less than men from extension information, suggesting that current programs may target the needs of male farmers (O'Sullivan *et al.* 2014).

For rights and decision-making power, the strongest support in the literature comes from a study done in Ghana, which examines the impact of land tenure rights on agricultural productivity. This study uses econometric modelling, productivity estimations and other analyses to examine how holding a position of power (which we operationalize in our levers as decision-making power), affects land tenure rights and influences investments in land fertility and corresponding agricultural productivity (Goldstein and Udry 2008). The authors found that plot productivity is correspondingly reduced for individuals with lower social and political power, who fallow their land less than is technically optimal due to the fear of expropriation of the land—and that this disproportionately affects women (Goldstein and Udry 2008). As a result, women's agricultural outputs are significantly reduced as compared to men's outputs. With respect to land itself (which is associated with the gender-related lever, control over income/assets/resources), *Levelling the Field* finds that even after a woman accesses land, characteristics of the land itself may be of lower quality than land owned by a man (O'Sullivan *et al.* 2014).

Gender gaps in labour are prominently discussed in the literature (Food and Agriculture Organization of the United Nations 2011; O'Sullivan *et al.* 2014). Depending on how it is operationalized and measured, agricultural labour can be viewed as having control over a resource (hired labour and household labour), or as paid labour (via childcare and household responsibilities that may limit women's opportunities for paid work). *Levelling the Field* categorizes these factors as household labour, hired labour and childcare and household responsibilities. *Levelling the Field* finds that in Ethiopia, Malawi, northern Nigeria, Tanzania and Uganda female farmers have fewer household members to provide labour on the farm than male farmers; and even when they do have labourers they get lower returns than male farmers regardless of whether the labour comes from within their household or is hired out. Also, unlike men, female farmers often play additional roles as caretakers of children and the household, which affects their agricultural productivity. For example, the number of children in the household influences female farmers' productivity more than male farmers' productivity in Malawi, Niger, southern Nigeria and Uganda (O'Sullivan *et al.* 2014). Finally, paid labour is also affected by gender gaps in access to markets. *Levelling the Field* finds a positive effect between access to markets and women's productivity. In Malawi, northern Nigeria and Uganda, female farmers' returns outperform male farmers' returns when women switch to high-value commercial agriculture (O'Sullivan *et al.* 2014).

With respect to education, *Levelling the Field* finds that the number of years of schooling is associated with productivity in Uganda and Malawi. In Uganda, for example, 'female plot managers complete on average 1.9 fewer years of schooling than male managers, and this difference explains a significant portion of the gender gap. Moreover, for each additional year of schooling, agricultural productivity increases more for men than for women' (O'Sullivan *et al.* 2014).

Financial services for the poor (FSP)

Distribution of the literature vis-à-vis the gender-related levers

While there is a significant body of literature examining associations between gender and economic empowerment, much of it falls outside of our search criteria either because it comes pre-2000, or because it focuses on GEWE as the outcome, rather than as the intervention. Furthermore, gendered aspects of the studies we reviewed were generally limited to disaggregating the data by sex, or simply targeting a female-only sample (Cultural Practice, LLC 2014; Bauchet *et al.* 2011; Cull *et al.* 2014; Morawczynski 2011).

At the request of our research sponsor, we specifically focused our search on DFS. The gendered FSP literature around DFS is currently in its infancy, as the sector itself is nascent. As a result, there are few studies that robustly measure the influence of GEWE on FSP outcomes. Only seven pertinent articles, all RCTs on non-digital FSP, could be found which incorporated gender elements in their studies, and all addressed some aspect of the same lever, control over assets/income/resources, which was variably addressed as return to capital/inputs, microsavings, financial literacy/business training, microcredit and mobile money (Table 9). Though none of these studies specifically examined DFS, we still include this sector because as an emerging field, it has great potential for gender gaps if not approached carefully.

Findings

None of the literature on DFS met our criteria for scientific rigor. The evidence from non-DFS research about gender is more robust; however, it remains to be seen how these studies will translate to a digital context. Furthermore, the results of the seven RCTs selected for non-digital FSP reflect mixed results for gendered effects on FSP outcomes, and thus the strength of the relationship has been categorized as medium.

Return to capital/inputs. At an organizational level, two RCTs provided grants (either cash or in-kind) to randomly selected businesses then measured the impact of the additional capital on business profits. The gender variable was operationalized in these two studies by comparing the sector outcome among male versus female business owners. An experimental study of over 400 businesses in Sri Lanka found high returns in male-owned businesses, but no increased access to capital among enterprises owned by females, suggesting that capital alone is not enough to grow female-owned subsistence businesses (De Mel *et al.* 2008).

The Sri Lanka experiment was replicated and expanded in Ghana, with mixed results for women business owners, depending on the mechanism to deliver capital (Fafchamps *et al.* 2011). Cash grants randomized to business owners produced no effect on profits for women but high returns for men. Among women with low initial profits, cash grants were diverted away from the business and used for household expenditures and transfers to non-household members. High rates of return were found among both male- and female-owned businesses that received in-kind grants, although women did

Table 9. Summary of studies in Financial Services for the Poor (FSP)

Article	Location	Type of study/Analysis	Gender-related lever(s)	Gender variable operationalized	Sector outcome
De Mel et al. (2008)	Sri Lanka	Experimental study Randomized control trial (RCT)	• Control over income/assets/resources/(Return to Capital)	Gender of business owners	Profits of the firm/business; replacement cost of assets; reported purchase of new assets, disposition of assets by sale/damage, repair and return to service of any previously damaged assets
Dupas and Robinson (2013)	Kenya	Experimental study (RCT)	• Control over income/assets/resources (Micro-savings)	Gender of business owners	Impact on savings, business outcomes, and expenditures and transfers
Fafchamps et al. (2011)	Ghana	Experimental study (RCT)	• Control over income/assets/resources (Return to Capital)	Gender of business owners and sector: male- or female-dominated	Monthly profits, capital stock
Ashraf et al.(2010)	Philippines	Experimental study (RCT)	• Control over income/assets/resources (Micro-savings)	Gender of participant; women's empowerment; impact on household decision-making	Inventory of assets; impact on savings; impact on savings attitudes; impact on economic decisions
Karlan and Valdivia (2011)	Peru	Program evaluation: experimental study, difference–in–differences estimation	• Control over income/assets/resources (Financial Literacy/ Business Training)	Sample of poor female entrepreneurs; included measure of empowerment in decision-making	Business outcomes, MCF institutional outcomes, business processes and knowledge, and household outcomes (decision-making and hours of child labor),
Karlan and Zinman (2011)	Philippines	Impact evaluation, experimental study, ordinary least squares estimation	• Control over income/assets/resources (Micro-credit)	Gender of business owner	Business investments, business activities, employees, personal (subjective) well-being
Kikulwe *et al.* (2014)	Kenya	Multivariate probit models (panel data)	• Control over income/assets/resources (mobile money)	Gender of household head	Total household income, remittances, mobile money use

not benefit if they had below-average profits (<$1 per day) or low initial capital.

Microsavings. Two RCTs facilitated access to savings mechanisms or a commitment device to examine the overall effect on business savings and outcomes. Dupas and Robinson (2013) randomized business-owners (primarily female market vendors or male bicycle taxi drivers) into non-interest-bearing bank accounts in rural Kenya (Dupas and Robinson 2013). For participants in the intervention group, the study paid the account opening fee and provided the minimum account balance for a savings account at the village bank. Women in the treatment group actively used the savings account ($P < 0.01$) and exhibited higher daily bank savings ($P < 0.01$) compared to the control group. Market women in the treatment group increased investment in their business 38–56% ($P = 0.14$) and had 37% higher expenditures compared with the control ($P = 0.11$) (Dupas and Robinson 2013).

The primary research goal of Ashraf et al. (2010) was to determine if access to a commitment savings product would lead to an increase in women's decision-making power in the Philippines; inventory of assets and savings behaviour, however, were also measured as sector outcomes of interest. The commitment savings product (SEED) required clients to commit to not withdraw funds until they reached a certain goal or date. Results show that the commitment device positively impacted women's household decision-making power (particularly for women with little decision-making power at baseline), self-perception of savings behaviour and consumption decisions regarding durable goods. (Ashraf et al. 2010). Karlan and Zinman (2011) reported more complex outcomes in their randomized evaluation of second-generation microcredit. They found that the effects of individual liability microloans were not more pronounced for women; however, their data show that microloans increase overall ability to cope with risk, strengthen community ties, and increase access to informal credit.

Financial literacy/business training. Karlan and Valdivia (2011) found no marginal impact of adding business training on business revenue, profits or employment (Karlan and Valdivia 2011).

While scientifically robust, the results regarding women's FSP outcomes of the seven RCTs are mixed. None of the articles reviewed for FSP that met our criteria examined the relationship between a gender-related lever and a FSP outcome in a digital context.

The main finding for FSP is the lack of peer-reviewed literature looking at gender in a digital financial context, particularly in the direction of interest (association of gender-integrated or women's empowerment interventions with FSP outcomes). Scientifically robust articles either primarily dealt with gender and non-DFS—specifically microfinance, microenterprise and savings accounts—while when describing DFS in general and gender differences in particular, literature was descriptive at best and often anecdotal.

Cross-sectoral Findings

Based on the 76 articles/compilations included in this review, we identified several patterns in the use of gender-related levers across the sectors. The gender-related levers can be grouped into three categories, which we called 'Wedges', 'Foundations' and 'Facilitators' (defined below and in Table 10).

Wedges

Three levers have been grouped into the category called 'Wedges': control over income/assets/resources, decision-making power and education. These variables have a strong association with

Table 10. Summary table of wedges, foundations and facilitators

GEWE lever	Sector	Implications
Wedges: strong, positive associations across multiple sectors		
Control over income/assets/resources	FP, FSP[a], MNCH, Nutrition, Agriculture, WASH	• Fundamental to agency, or an individual's ability to seek and achieve desired outcomes • High potential to leverage investments across sectors • Relatively high cost and high potential return • Programs addressing these levers may require additional resources and time to achieve sustainable results
Decision-making power	Agriculture, FP, MNCH, Nutrition, WASH[a]	
Education	Agriculture, FP, MNCH, Nutrition, WASH[b]	
Foundations: strong, positive associations across family health		
Equitable interpersonal relationships	FP, MNCH, Nutrition	• Can be expected to correlate with improved outcomes in one or more of the three sectors over a relatively short- to medium-term timeframe
Mobility	FP, MNCH, Nutrition	
Personal safety	FP, MNCH, Nutrition	
Facilitators: medium to strong, positive associations across two to three sectors		
Access to information	Agriculture, WASH	• Traditional elements of many development programs • Offer more limited leveraging opportunities • Possible to achieve relatively short-term results • Clear program interventions • Scaling up of such investments will yield benefits for the primary sector, but it is unclear whether they will have an impact across multiple sectors
Community groups	MNCH, Nutrition, WASH	
Paid labour	Agriculture, MNCH, Nutrition	
Rights	Agriculture, FP	

[a]The evidence on these relationships was mixed.

[b]In the WASH sector, much of the existing research on education describes WASH as the predictor, rather than the influence of education interventions on WASH outcomes.

development outcomes in a wide range of sectors. Components of these three levers overlap, but combined, they represent fundamental elements of *agency* or an individual's ability to seek and achieve desired outcomes. Increased (or more equitable) control over income/assets/resources makes it possible for a woman to choose to invest in her business, farm, family or community, or simply have the resources needed to leave an abusive situation. Having decision-making power in the household, family or community gives women the ability to help shape the present and future for herself and/or her family, including decisions about child bearing, schooling, employment and marriage of children, or expenditures on health care and food. Finally, being more educated increases the range of options a girl or woman will consider for herself and her family and helps her more effectively navigate institutions such as health clinics, banks and local government services. Combined with sectoral interventions that address opportunities and constraints (e.g. making contraceptives more readily available or changing laws that prevent women from owning land), these three levers have high potential to leverage investments across multiple sectors.

Control over income/assets/resources. We found support in the literature for a statistically significant and positive association across all six sectors; for FSP the results were mixed but still significant.

Decision-making power. The literature supports a strong and positive association between increased (or more equitable) levels of decision-making power, for women and outcomes in four sectors: Agriculture, FP, MNCH, Nutrition. In WASH the evidence was mixed.

Education. the literature included in this review presented findings of a strong and positive causal relationship between female education and four sectors: agriculture, FP, MNCH, Nutrition and WASH.[1] Primary education is associated with positive outcomes, and secondary education further enhances many of those outcomes.

Foundations

Three levers have been grouped into the category called 'Foundations': equitable interpersonal relationships, mobility and personal safety.[2] The evidence base for these levers is well-established and rigorous. They display a strong and positive association across the family health sectors (FP, MNCH and nutrition) and represent basic aspects of equality that need to be addressed in order to exercise agency. For example, a woman is much more likely to be able to access FP or MH services or even go to a market to buy nutritious foods for her child if she can speak openly with her partner about her decisions, leave her home freely and/or not fear that her physical safety is in jeopardy due to the decisions that she is making. While our search did not identify literature on these levers in agriculture, FSP or WASH (with the exception of one article that found personal safety to lead to improved sanitation; Tilley *et al.* 2013), it does not mean that 'Foundations' are not important in

1 The relationship between education and WASH appears stronger when examining improvements in education outcomes and their association with WASH interventions, rather than female education variables and WASH outcomes. Our inclusion criteria did not yield any studies that specifically discussed female education interventions and their effect on FSP outcomes.

2 See discussion in FP sector about the limitations of our search for uncovering the vast amount of literature on gender-based violence (GBV). While our review only included one article in each of the three sectors (FP, MNCH and Nutrition), it would misrepresent the evidence base to say that the association is less than strong for personal safety and these sectors.

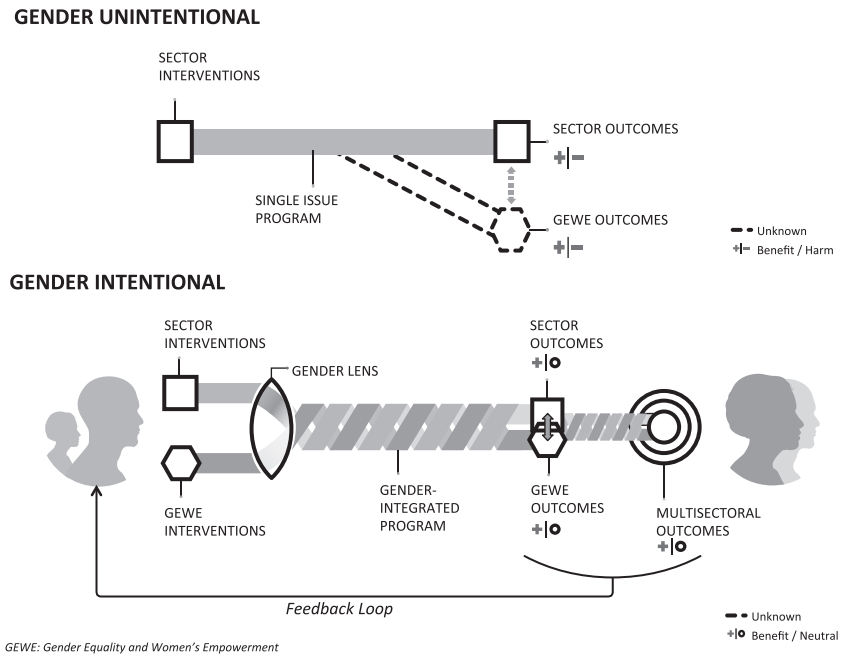

Figure 1. Integration of gender equality and women's and girls' empowerment interventions with sector intervention.

those sectors; rather, it suggests that our inclusion criteria did not capture any relevant research on these topics or that stronger associations might be present for sector interventions (as the independent variable) and gender outcomes (as the dependent variable) (e.g. WASH or FSP interventions associated with GEWE outcomes of mobility or safety).

Equitable interpersonal relationships. The literature supports a strong and positive association between equitable interpersonal relationships and outcomes in FP, MNCH and nutrition.

Mobility. Likewise, the review found statistically significant and positive associations between women's mobility and outcomes in FP, MNCH and nutrition.

Personal safety. The number of articles in this review with statistically significant associations between personal safety and FP, MNCH and nutrition was small but the findings were positive for each sector.

Facilitators

Four levers have been grouped into the category called 'Facilitators': access to information, community groups, paid labour and rights. These levers demonstrate strong to medium levels of evidence for significant and positive associations across two or three sectors. They make it easier for women and girls to achieve their goals and are also easily identifiable as traditional elements of development programmes. Giving women access to information about the market for crops or best practices in MHM, for example, can influence sector outcomes, as well as individual welfare. Community groups can provide psychological and other support—social capital effects—for women, which can amplify their voices in the community or even change behaviours in the household. Paid labour offers a range of opportunities for changing women's outcomes and status at the individual, household and community levels, as income can shift levels of decision-making power and influence. Finally, endowing women with the right to own land, get a bank loan or make decisions about their reproductive health without spousal consent can dramatically alter the course of women's lives, particularly when other levers—like any of the wedges above—are also in play.

Access to information. The review found statistically significant and positive associations between access to information and outcomes in agriculture and WASH.

Community groups. We found support in the literature for statistically significant and positive associations between community groups and MNCH, nutrition and WASH outcomes.

Paid labour. This lever was associated with significant, positive outcomes in agriculture, MNCH and nutrition.

Rights. The literature showed significant and positive associations between rights and agriculture and FP outcomes.

Discussion

Overall, it can be concluded that promoting GEWE is associated with improvements in a variety of health and development outcomes. As found in other recent reviews of the GEWE literature, our findings primarily identify significant associations—not causality—between GEWE interventions and health and development outcomes (Kraft *et al.* 2014; Muralidharan *et al.* 2014). The primary exception is education, where the strength of evidence supports a causal relationship between girls' education and improved health and development outcomes (Cutler and Lleras-Muney 2006; LeVine 2012). Two approaches to empowering women and girls—in addition to education—have particularly strong and broad associations with health and development benefits: promoting equitable control over income/assets/resources and equitable decision-making power. These approaches to GEWE encapsulate agency; empowering women with agency promotes their equality and broadly improves health and development for women, their families and their communities.

Many associations between GEWE interventions and improvements in health and development outcomes were cross-sectoral. This finding suggests that in order to fully realize the benefits of promoting GEWE, we need to work in more co-ordinated and integrated

ways across multiple sectors. Figure 1 illustrates this concept, emphasizing the value of integrating GEWE interventions with sector interventions, thus simultaneously improving gender and sector outcomes across multiple health and development indicators. On the other hand, failing to take gender inequalities into account not only may limit the achievement of health and development impact, but could also inadvertently lead to harm, and is an outmoded approach to development. Moreover, gender norms and inequalities are highly contextual. The data do not support a particular gender intervention as a 'silver bullet' that will work in all contexts. Instead, the literature identifies potential programme elements—gender interventions [or levers] —that could work alone or in combination, depending on the context. Rather than seeking to make gendered interventions universally generalizable, we should recognize the value of their contextual nature and identify, at the start of each programme, the variations that can significantly help or hinder sector outcomes in that setting, and monitor and evaluate both gender and sector (or health and development) outcomes.

We also need to learn more about how to best apply these approaches in various contexts to achieve outcomes across multiple sectors, and how to measure the impact. Much of the literature included in this review calls for further research and rigorous evaluation to test different gendered interventions and to identify more precisely the mechanisms by which they work and under what circumstances (and when and why they do not). The programming implications, then, are clear: rather than seeking to make gendered interventions universally generalizable, we should recognize the value of their contextual nature and identify, at the start of programme design, the variations that can significantly help or hinder sector outcomes in that setting, and plan to monitor and evaluate both gender and sector (or health and development) outcomes accordingly.

The nature of programming, level of investment and opportunities for leveraging vary substantially between the groups of levers presented above. The 'Facilitators' offer relatively short-term results (e.g. increased % of women with title to land within 3 years of a change in law) and clear programme interventions (advocacy for change in law or its implementation). The synthesis of the evidence, however, suggests they offer fewer leveraging opportunities than the 'Wedges'. The levers in the 'Facilitator' group—access to information, community groups, paid labour and rights—likely are part of existing development investments in one or more sectors. Our review suggests that investments in these levers will have an impact primarily in the sector that is financing the intervention (e.g. work on land rights will affect agricultural productivity). While a convincing case can be made (and undoubtedly has been) that investments in these levers would impact outcomes in other sectors as well, the parameters of our literature review did not provide any supporting evidence of this point, and requires further investigation. Scaling up of such investments will yield benefits for the primary sector, but it is unclear whether they will have an impact across multiple sectors.

On the other end of the spectrum, "Wedges" —control over income/assets/resources, decision-making power and education—have a wealth of evidence to support their association with impacts in multiple sectors. Investments to increase (or make more equitable) women's control of income/assets/resources, for example, can be expected to correlate with improved outcomes in at least five of the sectors we examined, and possibly six (since the evidence for FSP was mixed in this review). Programs addressing these levers, however, may require more resources and time to achieve sustainable results; some gender-related norms and behaviours can be deeply entrenched making it difficult to predict the duration of the intervention(s) required to achieve real change. Investments in the "Wedges" have the potential for high costs, but also high returns with the greatest impacts over time and multiple sectors.

The "Foundations" represent the "happy medium": investments in these levers are likely to be part of ongoing development programmes in FP, MNCH and Nutrition. They reasonably can be expected to correlate with improved outcomes in one or more of the three sectors, and results usually are seen in the short to medium term. An intervention to increase women's mobility (freedom of movement), for example, will likely produce improvements in FP outcomes, based on the evidence. That same increase in freedom of movement almost certainly will be associated with improved outcomes in other sectors as well: women's freedom to visit health clinics, for example, can also change MNCH and/or nutrition outcomes.

Research Recommendations

Our review of the literature did not produce the kind of efficacy evidence that would meet the needs of the medical community, for example, trying to decide about investing in new treatments. It did, however, suggest broad areas of evidence and agreement among sector experts about associations, and even some degree of causality between GEWE interventions and health and development outcomes. The evidence base is strongest for the effects of female education on a variety of outcomes, and natural experiments in this sector allow for claims of causality (Cutler and Lleras-Muney 2006; LeVine 2012). Emerging evidence from the agriculture sector about GEWE and productivity levels is also sparking discussion of causality (O'Sullivan *et al.* 2014; Goldstein and Udry 2008). Outside of these two sectors, the evidence about GEWE interventions and health and development outcomes is based on association, and largely indicates a statistically significant, positive association between improved GEWE and a range of sector outcomes of interest.

To go beyond those rather general statements will require a degree of investment in rigorous evaluation of gender-related programming that far exceeds the norm to date. Until very recently, most development programmes did not invest up-front to get baselines on GEWE, nor were they intentional throughout implementation and in monitoring and evaluation. Instead, gender issues, both positive and negative, emerged during implementation or the final evaluation, whereupon they were documented and perhaps subjected to a retrospective analysis, often using qualitative methods and with a minimal budget. Likewise, efforts to cost out gender interventions and compare their effectiveness are scarce to non-existent, as are data on the impact of GEWE interventions across multiple sectors (apart from the FP/MNCH/nutrition fields, where research studies often simultaneously assess outcomes in one or more of these three sectors).

We identified general gaps in the literature (post-2000) about (1) what works well, why and under what conditions in agriculture, FSP and WASH; (2) what will have impacts across multiple sectors, the causal pathways for these impacts and under what conditions; and (3) what is most cost-effective and under what conditions. More specifically, across the six sectors we examined, the following themes and questions emerged:

We need a better understanding of the "black box" of intra-household decision-making, including in multigenerational households.

We still are missing much-needed data on: new categories of household head (single income, female-headed; dual income,

female-headed; single-income, male-headed etc.); time allocation patterns and control over income/assets/resources; and accurate measures of women's empowerment in Africa.

We lack evidence, and in some cases, understanding, of the causal pathways by which GEWE interventions produce sector outcomes. How do we unpack GEWE interventions to identify and optimize the microsocial processes that drive positive or negative outcomes within sectors and across them?

What is the evidence from gender-sensitive impact evaluations, which are largely contained in the grey literature? What are the common elements of the most robust impact evaluations that address GEWE interventions and how can the methodologies be tested and replicated?

Are GEWE interventions cost-effective? Are they sustainable over time, and under what conditions?

How do we meet context-specific gender needs in programmes, and what does this mean for scaling up efforts?

How can we anticipate and design programmes to avoid unintended consequences of GEWE interventions, including GBV?

Based on the synthesis, we identify the need for investment in rigorous evaluation of interventions designed to identify which GEWE levers or combinations of levers have the most potential to improve outcomes in a sector or improve outcomes across multiple sectors in a given context. The three levers categorized as "Wedges" in the previous section (control over income/assets/resources, decision-making power and education) have high potential for impact, even though the results are likely to take longer to assess than the lifespan of the typical 3- to 5-year development programme. At least one or two of the "Facilitators" would be good candidates for rigorous evaluation, including community groups and access to information (with a special focus on e-technology).

Overall, however, the evidence is strong in support of investing in GEWE interventions as a powerful means not only for achieving greater gender equality, but also for improving a diversity of health and development outcomes. There is great need, however, for programmatic learning about how to most effectively address gender inequalities and empower women and girls in ways that lead to improved outcomes, including across multiple sectors at once.

Panel 1. Assumptions from Pre-2000 Evidence Base

Formative research in the gender field began in the late 1970s and early 1980s, with discussions focusing on how women's status should be defined and what factors influenced women's empowerment within various geographic regions (Mason 1984; Dyson and Moore 1983). Later, studies focused on what aspects of women's status affected other outcomes, especially within the health sector. Researchers differentiated between women's status, or position in society, and women's interpersonal control, or autonomy (Mason 1984; Mason 1993). In the 1990s, evidence showed that women's and children's development outcomes are affected by women's autonomy or interpersonal control. This early work also demonstrated that many factors affect women's empowerment, with education and literacy being primary, along with paid employment, relationships with kin and household members, the presence of children (and sometimes specifically sons) and age (Balk 1994; Bloom *et al.* 2001). All of these factors were considered as markers of women's position in society and important to development outcomes, but only as proxies for women's empowerment, rather than direct measures of women's interpersonal control.

During the 1990s, researchers were interested in measuring direct indicators of women's autonomy and exploring how they affect development outcomes. Control over income and assets, decision-making power, freedom of movement, being able to do things independently without asking permission, and other factors were identified as predictors of GEWE. Further research demonstrated that these dimensions of autonomy should be measured and modelled separately; otherwise, the effects would be lost in empirical models (Balk 1994; Vlassoff 1992; Jejeebhoy 1997). The majority of these studies took place in Asia, especially South Asia, with only a few in other regions of the world. Many of these variables were so exhaustively explored during the 1990s (such as freedom of movement and its effects on RH outcomes) that in the post 2000 literature they were less frequent or were controlled for in multivariate analyses.

This section gives a brief summary of the main findings from before the Year 2000, in order to establish background knowledge and enable differentiation between a lack of evidence to support a particular lever which necessitates further research, and a lever that was addressed in pre-2000 literature and thus does not come up in our search.

FP, MNCH and nutrition. Several studies document the positive association between women's autonomy and MH and FP outcomes, as manifested through access to information, paid labour, and participation in community groups (Dharmalingam and Philip Morgan 1996; Vlassoff 1992; Visaria *et al.* 1999). Women's mobility and control over finances are strong predictors of contraceptive use, smaller family size, longer birth intervals, as well as MH outcomes (Dharmalingam and Philip Morgan 1996; Schuler and Hashemi 1994; Vlassoff 1992; Visaria *et al.* 1999; Jejeebhoy 1991).

Studies also document an independent, positive association between child health and nutrition outcomes and various gender levers, such as control over resources, decision-making power and freedom of movement (Abadian 1793; Malhotra *et al.* 1995; Doan and Bisharat 1990; Ramalingaswami *et al.* 1996). Several studies, especially from the 1990s, demonstrate that access to information through nutrition education programmes and community-based nutrition programmes leads to improved child nutrition outcomes (Berg 1987; Thomas 1990; Gillespie 1991; Gillespie *et al.* 1992; Ndure *et al.* 1999).

WASH. WASH is relatively new as an independent development sector. During the 1970s and 1980s, integrated programmes often included WASH components. However, with the movement towards vertical programmes in the 1990s and nascent cost–benefit analyses, WASH programmes often were de-emphasized (Briscoe 1984). Simultaneously, a general divergence between health and sanitation occurred, with environmental health concerns like sanitation shifting into (engineering-oriented) environment or infrastructure departments (Bartram 2008; Heller 2009). Although several twentieth-century case studies provide qualitative descriptions of the importance of women's influence on WASH outcomes, gender-oriented academic research focused on health outcomes and not WASH outcomes.

Agriculture. The methodology for compiling evidence in the agriculture sector varied from that used for other sectors due to the fact that several well-vetted, comprehensive reviews have already been conducted on the subject (Food and Agriculture Organization of the United Nations 2011; O'Sullivan *et al.* 2014). Most importantly, The State of Food and Agriculture (SOFA) 2010–11 extensively reviewed evidence from 1983 (when the previous SOFA gender and agriculture review was conducted) onward. Likewise, Gender in Agriculture: Closing the Knowledge Gap encompasses pre-2000 literature as well. Therefore, results in this sector reflect both pre- and post-2000 literature.

FSP. In FSP, DFS work emerged post-2000; the pre-2000 work on FSP was largely focused on microcredit (such as the Grameen Bank model) in the 1980s and 1990s. Institutions such as Women's World Banking and others led the charge early-on to improve access to credit for women and then evolved over time to include diverse financial products, such as savings, insurance and technological innovations. Much of the research during the pre-2000 period focused on how microcredit programmes affected gender outcomes (like decision-making power), fertility, as well as educational outcomes for children. Very little attention was paid to investigating how gender relations affected the outcome of microcredit programmes themselves (MacIsaac 1997; Panjaitan-Drioadisuryo and Cloud 1999; Johnson 2005; Rankin 2002; Otero 2003).

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