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Can a Gender-sensitive Integrated Poultry Value Chain and Nutrition Intervention among the Rural Poor Increase Women's Empowerment in Burkina Faso?

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ABSTRACT

Understanding the types of food systems interventions that foster women's empowerment and the types of women that are able to benefit from different interventions is important for development policy. SELEVER was a gender- and nutrition-sensitive poultry production intervention implemented in western Burkina Faso from 2017 to 2020 that aimed to empower women. We evaluated SELEVER using a mixed-methods cluster-randomized controlled trial, which included survey data from 1763 households at baseline and endline and a sub-sample for two interim lean season surveys. We used the multidimensional project-level Women's Empowerment in Agriculture Index (pro-WEAI), which consists of 12 binary indicators, underlying count versions of 10 of these, an aggregate empowerment score (continuous) and a binary aggregate empowerment indicator, all for women and men. Women's and men's scores were compared to assess gender parity. We also assessed impacts on health and nutrition agency using the pro-WEAI health and nutrition module. We estimated program impact using analysis of covariance (ANCOVA) models and examined whether there were differential impacts by flock size or among those who participated in program activities. Program impacts on empowerment and gender parity were null, despite the program's careful approach to developing a gender-sensitive intervention. Meanwhile, results of the in-depth gender-focused qualitative work conducted near the project mid-point found there was greater awareness in the community of women's time burden and their economic contributions, but it did not seem that awareness led to increased empowerment of women. We reflect on possible explanations for the null findings. One notable explanation may be the lack of a productive asset transfer, which have previously been shown to be essential, but not sufficient, for the empowerment of women in agricultural development programs. We consider these findings in light of current debates on asset transfers. Unfortunately, null impacts on women's empowerment are not uncommon, and it is important to learn from such findings to strengthen future program design and delivery.

Keywords: Agricultural development, Burkina Faso, Mixed-methods research, Poultry value chains, Women's empowerment

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ACRONYMS

BCC	behavior change communication
GAAP2	Gender, Agriculture, and Assets Project (Phase 2)
NGO	non-governmental organization
Pro-WEAI	project-level Women's Empowerment in Agriculture Index
SELEVER	Soutenir l'Exploitation Familiale pour Lancer l'Elevage des Volailles et Valoriser l'Economie Rurale
VVV	Village-level vaccinators
WASH	water, sanitation, and hygiene

1. INTRODUCTION

Women around the world are often heavily involved in the labor of agricultural production and home-based processing, but they are often less involved in agricultural markets due to a range of gender-based barriers (Malapit et al., 2020; Manzanera-Ruiz et al., 2016; Njuki et al., 2022). Gender-sensitive food systems interventions that focus on increasing women's participation in value chains and agricultural markets have the potential to empower women and improve gender equality. Under some conditions, increasing women's linkages with agricultural markets has the potential to increase their control over income and intrahousehold bargaining power (David, 2015; Rubin et al., 2009). However, such outcomes are not a given. Increased participation in food systems, through processing and marketing, may not necessarily lead to increased empowerment and may depend on the structure of the local economy, gender norms, or the type of commodity (A. Quisumbing, Heckert, et al., 2021). Poorer and more disempowered women, and those living in areas with especially restrictive gender norms, may experience more significant barriers entering markets, which raises the question of whether market-focused interventions can facilitate improved outcomes for these women and what types of programming are most conducive to women's empowerment in these circumstances.

In this study, we draw on Kabeer's (1999) definition of empowerment as the process by which people expand their ability to make strategic life choices, particularly in contexts where this ability was previously denied to them. This definition encompasses three components: resources (access to and future claims on material human, and social resources), agency (decision-making and negotiation), and achievement (self-defined outcomes or goals). Increasingly, agricultural development interventions aim to increase women's involvement in agricultural markets and to increase their empowerment. There is a rapidly growing body of research that aims to identify the types of agricultural development interventions and implementation strategies that successfully increase women's empowerment. Most of the evidence examining what works to empower women in agriculture focuses on interventions that target women's roles in production (A. Quisumbing et al., 2022). Meanwhile, there have been relatively few studies to

date that look at the impacts of market-focused interventions on women's empowerment, and thus, no clear evidence on whether interventions that aim to increase women's roles in either processing or marketing can help foster women's empowerment; such evidence is important for strengthening gender-sensitive food systems interventions (A. Quisumbing, Heckert, et al., 2021). It is important to understand the types of interventions that successfully foster women's empowerment, as well as which women are able to benefit from these interventions, so that the successes and failures of such programs can be used to improve such approaches.

There is some evidence that women's increased engagement in food systems, and specifically the commercialization of food systems can lead to greater empowerment of women and increased control over incomes (Rubin et al., 2009). A synthesis of multiple studies focused on gender and market-oriented agriculture in Asia and Africa concluded that for well-designed interventions it was possible for such projects to increase women's incomes as well as their control over their assets and incomes (A. R. Quisumbing et al., 2015). However, many of these dynamics may differ by context and for populations within these contexts (David, 2015; Malapit et al., 2020; A. Quisumbing, Heckert, et al., 2021).

Additionally, lessons learned across a wide range of studies demonstrate that there are significant barriers to women's integration into markets. In a study of milk traders in peri-urban Nairobi, Kenya, Galie and colleagues (2022) found that milk retail businesses were more profitable for men, compared to women, because of the difficulties that women experienced sourcing milk. Constraints on women's freedom of movement and their agency over how they spend their time leads them to purchase milk at higher prices and puts them at the risk of purchasing spoiled milk. Across multiple countries in sub-Saharan Africa, labor and resource (capital) constraints are the primary factors preventing women farmers from being able to produce a marketable surplus (Djurfeldt, 2018). Moreover, women often lose control over assets and the sale of marketable agricultural products as products increase in value and men gain control of these products (Forsythe et al., 2016; Manzanera-Ruiz et al., 2016)

Soutenir l'Exploitation Familiale pour Lancer l'Elevage des Volailles et Valoriser l'Economie Rurale[1] (SELEVER) is a gender-sensitive food systems intervention that focuses on the poultry value chain and nutrition. It was designed to target both producers and consumers to increase both the supply of and demand for poultry. SELEVER was implemented by Tanager International in western Burkina Faso and evaluated by IFPRI using a cluster-randomized controlled trial (cRCT) study design (Gelli et al., 2017). The study was also accompanied by formative qualitative research, a process evaluation, and in-depth qualitative research focused on gender at the midpoint of project implementation. Women's empowerment, which is the focus of this paper, is one of the pre-specified secondary trial outcomes. Previous papers have reported on the results of the other trial outcomes. SELEVER had only a minimal impact on diets and micronutrient intake (positive impacts on egg consumption in 2- to 4-year-olds at endline) (Becquey et al., 2022). SELEVER had a significant, although relatively small, impact on women's poultry outcomes (ownership, profits, and revenue); these impacts are primarily attributable to a shift in considering the poultry as an asset that is jointly owned with male household members to labeling it women-owned (Leight et al., 2022). Even this small shift, however, is meaningful considering that women have limited control over assets in this context (Njuki & Mburu, 2013). With regards to women's empowerment specifically, analysis of lean season impacts, which were assessed midway through program implementation, found that there were no impacts on either women's time use or their self-efficacy (only empowerment indicators collected in the lean season) (Leight et al., 2021). Our results, herein, find no significant impact on women's empowerment at endline, even after considering whether there were differential impacts among those who participated in program activities (treatment on the treated analysis) or among those with larger flocks.

In the following sections we describe our study methods and results in detail. We then reflect on the null findings, including potential explanations for them, as well as what they mean for the design and implementation of future projects that aim to empower women through market-focused agriculture.

[1] Also known as the Women's Poultry Program to Improve Income and Nutrition.

2. METHODS

2.1 Country context

Burkina Faso, located in the West African Sahel, is one of the least economically developed countries and consistently ranks in the bottom 10 in the Human Development Index (United Nations Development Programme, 2021). The status of women in Burkina Faso is relatively low. Women marry early: the median age at first marriage is 17.8 years. Formal educational attainment is low, especially among women: 73.9% of women never attended school and only 22.5% are literate, compared to 59.3% and 37.6% of men, respectively (Institut National de la Statistique et de la Démographie-INSD, Burkina Faso & I.C.F. International, 2012). Additionally, a relatively high share of the population, compared to other countries in the region, views wife-beating as acceptable (43.5% of women and 34.1% of men) (Institut National de la Statistique et de la Démographie-INSD, Burkina Faso & I.C.F. International, 2012). Nearly half of women are anemic and 16% are underweight (BMI < 18.5 kg/m2), and similarly, there are high rates of child stunting (35%), wasting (16%), anemia (88%) (Institut National de la Statistique et de la Démographie-INSD, Burkina Faso & I.C.F. International, 2012).

Women in Burkina Faso are economically active and contribute significantly to agricultural labor. They play a key role in poultry production but have limited freedom of movement and access to poultry markets; husbands and sons typically take women's poultry to market and/or sell it to traders (Gelli et al., 2017). In the study area, there is also a sizeable gender gap in poultry ownership and access to poultry services; women own smaller flocks and have less access to veterinary and agricultural extension services (Gelli et al., 2017).

2.2 Program design

The SELEVER intervention aimed to increase poultry production, improve the nutritional status of women and children, and empower women in the Centre Ouest, Hauts-Bassins, and Boucle de Mouhoun regions of Burkina Faso. The program addressed poultry production, nutrition, and gender

through two complementary components: one on poultry production and marketing, the other on nutrition and gender. An intensive water, sanitation, and hygiene (WASH) component (SELEVER+WASH) focused on health and hygiene related to poultry management was delivered to a subset of the treatment group (Gelli et al., 2017).

The poultry production and marketing component included vaccinations, financing and training on poultry flock management and housing. At the community level, trainings raised the awareness of influential community members to advocate for women's role in decision making. Some aspects of the program differed according to the local NGO that implemented the activity. In one area, interested producers were identified and organized into micro-credit groups called Mutuelles de Solidarité (15-30 members each and approximately seven per village). In another area, interested producers were organized in Solidarity Groups—15 people (both women and men) interested in poultry breeding, with approximately 10 Solidarity Groups per village. Beneficiary groups were trained by the NGO facilitators on the SELEVER poultry modules. The facilitators monitored beneficiaries' credit use and poultry production.

Village-level vaccinators (VVVs), who are present throughout the treatment and control areas, were key community-level actors in the implementation of the SELEVER poultry component. VVVs are identified by the livestock services and trained on vaccination and poultry husbandry. After their training, they offer follow-up extension and vaccination services, poultry deworming and nutritional advice to the beneficiaries; these services are offered for a fee based on the number of vaccinations delivered. Additionally, government representatives from livestock extension services, the Direction régionale des ressources animales et halieutiques[2], provided technical support through the training and monitoring of VVVs, support to NGO facilitators for poultry trainings, market facilitation, and maintaining VVVs' supply of vaccines and other livestock inputs. In treatment communities, VVVs received some capacity building to address some key constraints in their ability to provide quality services. This involved a set of

[2] The government entity responsible for livestock and fishing resources.

targeted poultry and nutrition trainings that were provided alongside a start-up kit including an icebox and vaccines. The program also trained a cohort of female VVVs that were intended to help improve the dynamics between women producers and VVVs. However, VVVs were widely present and active in the full sample; so VVVs themselves are not an innovation introduced by the intervention.

The nutrition and gender curriculums were distinct, but fully integrated in their delivery, which was done by a different set of local NGOs from those implementing the poultry trainings. It included a behavior change communication (BCC) curriculum on nutrition and diets provided through women's groups, poultry producer groups, and local community leaders, provided through trainings and follow-up home visits. The BCC activities promoted improved diets at key stages of the lifecycle, including breastfeeding and infant and young child feeding practices, and basic hygiene. The gender component included community-level sensitization on women's economic empowerment and gender equity and strengthening of women's groups. The activities included, for example, training participants from existing women's associations on enterprise development, including village saving and loans and enhancing commercial opportunities. The activities also focused on strengthening women's role in decision-making within households and the community on entrepreneurship, nutritious food production, marketing, consumption, and child health, feeding and care.

2.3 Trial design

SELEVER was evaluated using a cluster-randomized controlled trial in 120 rural and peri-urban clusters. Among the 120 study clusters, 60 were randomly assigned to the SELEVER treatment arm, the SELEVER+WASH treatment arm, and the control arm. Study households were identified based on having a woman aged 15-49 years who had at least one child aged 2-4 years living in the household at baseline. In the first stage of randomization for the main trial comparisons, 30 communes each were selected for the treatment and control arms and two villages were selected per commune using restricted randomization. In brief, the restricted randomization procedure modelled selection using commune- and village-level variables from the national census of 2006, including population size, existence of a

government center, number of women's associations, main agricultural crop, main source of revenue, market access, health center presence, number of functional boreholes, and number of functional wells. An algorithm was developed using Stata to randomly allocate communes to two groups stratifying by region, and then select two villages in each commune from the list of available villages. In the second stage of randomization for comparison between SELEVER and SELEVER+WASH, 15 communes each were selected for the SELEVER, SELEVER+WASH, and control arms using a similar restricted randomization procedure. More complete details on the study protocol and randomization procedure have been published previously (Gelli et al., 2017). In this study, we focus the quantitative findings on results of the combined SELEVER and SELEVER+WASH treatment arms, as the gender strategy did not differ between the two arms, and the women's empowerment impact results for the two arms were similar. Additionally, qualitative work was integrated into the formative stage and at the study midpoint. Later in this paper, we summarize the methods and relevant findings from the midline qualitative study to triangulate findings and provide additional nuance to them.

2.4 Survey data collection

Baseline data were collected in March 2017 (post-harvest season) with a target sample of 1,800 households (15 households per village, 120 villages); 1,763 households were avaialable. Endline data collection began in March 2020, was postponed, due to the COVID19 pandemic, and resumed in August 2020. Additionally, lean season surveys were conducted in September 2017 and 2019 from a subsample of 1,080 households (90 villages). Each household was administered a household questionnaire focused on household characteristics and economic activities, an individual woman's survey to the woman primarily responsible for poultry activities, and an individual man's survey to the primary male decision maker. Anthropometry and other biomarker data were also collected. Attrition across the survey waves was minimal and has been described previously (Becquey et al., 2022; Leight et al., 2022)

2.5 Measures of empowerment

SELEVER's impact on women's empowerment was evaluated in collaboration with the Gender Assets and Agriculture Project, Phase 2 (GAAP2). GAAP2 aimed to develop the project-level Women's Empowerment in Agriculture Index (pro-WEAI) to measure the empowerment of men and women using a portfolio of 13 agricultural development projects and to use the common metric to identify what works to empower women in these projects. Pro-WEAI is a survey-based index for measuring empowerment, agency, and inclusion of women and men in the agriculture sector (Malapit et al. 2019). Pro-WEAI is comprised of 12 binary indicators of empowerment, a continuous aggregated empowerment score, and a binary empowerment indicator for women and men (Table 1). The 12 binary indicators of empowerment include four indicators of intrinsic agency (autonomy in income, self-efficacy, attitudes about intimate partner violence, and respect among household members); six indicators of instrumental agency (input in productive decisions, ownership of land and other assets, access to and decisions on financial services, control over use of income, work balance, and visiting important locations); and two indicators of collective agency (group membership and membership in influential groups). A respondent is considered adequate in each indicator if they have reached a certain threshold based on standard cutoffs established in Malapit et al. (2019) and described in Table 1. The continuous aggregated empowerment score is the proportion of indicators for which a respondent is adequate. A respondent is considered empowered if they achieve adequacy in at least 9 of the 12 indicators. The empowerment scores of men and women in the same household are compared to evaluate gender parity. The continuous empowerment gap indicator is the difference in empowerment score between the man and woman in a household. Households are considered to have achieved gender parity (binary) if the woman is empowered or at least as empowered as the man. The indicators and thresholds are based on the pro-WEAI protocols published by Malapit et al. (2019).

Table 1: Indicators of women's and men's empowerment

Indicator	Level	Type	Definition
Aggregate indicators			
Empowerment score	Individual	Continuous	Proportion of indicators of empowerment respondent is adequate in
Empowered	Individual	Binary	Respondent is adequate in at least 9 of 12 indicators of empowerment
Empowerment gap	Household	Continuous	Difference between empowerment scores of man and woman in the same household
Gender parity	Household	Binary	Woman is empowered or has empowerment score at least as high as the man in the same household
Core pro-WEAI indicators			
Intrinsic agency			
Autonomy in income	Individual	Binary	More motivated by own values than by coercion or fear of others' disapproval; Relative Autonomy Index>=1 (Ryan and Deci 2000)
Self-efficacy	Individual	Binary	Agree or greater on average with self-efficacy questions in the New General Self-Efficacy Scale (Chen, Gully, and Eden 2001)
Attitudes about intimate partner violence	Individual	Binary	Believes husband is not justified in hitting or beating wife in all five scenarios: she goes without telling him; she neglects the children; she argues with him; she refuses to have sex with him; she burns the food
Respect among household members	Individual	Binary	Meets all of the following conditions related to the spouse, other respondent, or another household member most of the time: respondent respects relation, relation respects respondent, respondent trusts relations, respondent is comfortable disagreeing with relation
Instrumental agency			
Input in productive decisions	Individual	Binary	Makes decision solely, makes decision jointly and has at least some in input in the decisions, or feels could make decision for all agricultural activities they participate in
Ownership of land and other assets	Individual	Binary	Solely or jointly owns at least three assets or land
Access to and decisions on financial services	Individual	Binary	Meets one of the following conditions: belongs to a household that used a source of credit in the past year and participated in at least one decision about it; belongs to a household that did not use credit but could have if wanted to; has sole or joint access to a financial account
Control over use of income	Individual	Binary	Has input in decisions related to how to use both income and output from all agricultural activities they participate in and has in put in decisions related to income from all non-agricultural activities they participate in
Work balance	Individual	Binary	Workload less than 10.5 hours per day, where workload=time spent on primary activities + (1/2)*time spend on childcare as a secondary activity
Visiting important locations	Individual	Binary	Visits at least two locations of city, market, family/relative's house at least once per week, or visits health facility or public meeting at least once per month
Collective agency			
Group membership	Individual	Binary	Active member of at least one community group
Membership in influential groups	Individual	Binary	Active member of at least one community group that can influence the community to at least a medium extent
Health and nutrition agency indicators			
Decides on own health and diet	Individual, women only	Binary	Has input in decisions about resting when ill, foods to prepare, and foods to eat
Decides on health and diet during pregnancy	Individual, women only	Binary	Has input in decisions about work and rest and consuming eggs, milk, and meat/poultry/fish, when pregnant
Decides on child's diet	Individual, women only	Binary	Has input in decisions about feeding eggs, milk, and meat/poultry/fish to child and feeding child when sick

Indicator	Level	Type	Definition
Decides on weaning and breastfeeding	Individual, women only	Binary	Has input in decisions about breastfeeding, ending breastfeeding, and complementary foods
Decides to seek healthcare	Individual, women only	Binary	Has input in decisions about going to the doctor when ill and when pregnant, having another child, using contraception, taking child to doctor when sick and for well visits
Decides to purchase food and health products	Individual, women only	Binary	Has input in decisions about purchasing small and large foods, eggs, milk, meat/poultry/fish, medicines for child and self, and toiletries
Access to food and health products	Individual, women only	Binary	Able to acquire small and large foods, eggs, milk, meat/poultry/fish, medicines for child and self, and toiletries
Count versions of core pro-WEAI indicators			
New General Self-Efficacy Scale	Individual	Count	Score on the New General Self-Efficacy Scale (Chen et al. 2001)
Number of violence situations	Individual	Count	Number of scenarios in which believes husband is not justified in hitting or beating wife: she goes without telling him; she neglects the children; she argues with him; she refuses to have sex with him; she burns the food
Number of production decisions	Individual	Count	Number of agricultural activities for which makes decision solely, makes decision jointly and has at least some in input in the decisions, or feels could make decision
Number of assets owned	Individual	Count	Number of assets they own solely or jointly
Number of credit sources	Individual	Count	Number of sources of credit they participated in decisions about
Number of income decisions	Individual	Count	Number of activities for which has input in decisions related to income and outputs
Hours spent on work	Individual	Count	Number of hours spent on work
Number of visit locations	Individual	Count	Number of locations respondent visits once per week (city, market, family/relative) or once per month (health facility, public meeting)
Number of groups	Individual	Count	Number of community groups they are an active member of
Number of influential groups	Individual	Count	Number of community groups that can influence the community to at least a medium extent that they are an active member of
Poultry-specific empowerment indicators			
Decisions on poultry production	Individual	Count	Number of poultry-related activities for which makes decision solely, makes decision jointly and has at least some in input in the decisions, or feels could make decision
Owns poultry	Individual	Binary	Solely or jointly owns poultry
Decisions on poultry income	Individual	Count	Number of poultry-related activities for which has input in decisions related to income and outputs
Hours on poultry work	Individual	Count	Number of hours spent on poultry-related work

Note: Detailed indicator descriptions are available in Malapit et al. (2019) and Heckert et al. (n.d.)

Seven indicators of women's empowerment in nutrition and health are calculated, including decisions about own health and diet, decisions about health and diet during pregnancy, decisions about child's diet, decisions about weaning and breastfeeding, deciding to seek healthcare, decisions about purchasing food and health products, and access to food and health products. Pro-WEAI nutrition and health indicators are based on Heckert et al. (Heckert et al., n.d.).

Count versions of 10 of the empowerment indicators are also created to assess robustness of the findings using binary indicators. For example, the count version of the group membership indicator is the number of community groups in which a respondent is an active member. Count versions are not feasible for autonomy in income and respect among household members due to the structure of survey items used to calculate these indicators. In addition, poultry-specific empowerment indicators are constructed, including decisions on poultry production, ownership of poultry, decisions on poultry income, and hours spent on poultry-related work. Table 1 shows definitions of all empowerment indicators.

All pro-WEAI survey modules were collected at baseline and endline from the woman and man adult decision-makers in each household. Data related to work balance, self-efficacy, empowerment in nutrition and health were also collected during the two lean season surveys.

The indicators that comprise pro-WEAI were developed in collaboration with the GAAP2 portfolio which brought together project implementors and researchers focused on women's empowerment in multiple contexts. Indicator developed was also informed by complementary qualitative research (Meinzen-Dick et al., 2019). When women in SELEVER communities were asked to describe empowered women, they were often described in terms of economic empowerment, both in terms of their control over assets, their ability to make decisions about household resources, and their ability to earn money, especially in support of their families (Eissler et al., 2020a). They were also described in relation to their ability to encourage people to do things as a group and to be able to express themselves publicly. These themes map closely to many of the instrumental and collective agency indicators in pro-WEAI.

2.6 Treatment effect estimates

Program impacts on women's and men's empowerment were estimated using analysis of covariance (ANCOVA) models.

$$Y_{ivc} = B_0 + B_1 S_{vc} + X_{ivc} + \epsilon_{ivc}$$

In this model, Y is the empowerment outcome at endline for individual or household i in village v and commune c and S is whether the commune was assigned to the treatment group (either SELEVER or SELEVER+WASH). X refers to individual and/or household covariates, including household size and age of the respondent (individual-level outcomes) or age of the female respondent in the household (household-level outcomes). Standard errors are clustered at the commune level. In each table, the threshold for statistical significance is adjusted using a Bonferroni correction for the number of tests shown in that table (e.g., in a table showing six significance tests, significance is indicated where $p<(0.05/6)$).

Supplementary analyses compared program impacts across the second level randomization (SELEVER treatment, SELEVER+WASH, and control); program impacts on the treated using propensity score weighted regression; and program impacts stratified by poultry flock size and household wealth (see the Appendix). We do not report these results in detail because they do not differ substantially from the primary specifications.

3. RESULTS

3.1 Description of the sample

Nearly all households in the sample were dual adult households, defined as having at least one male and one female adult. Households were large (average 8.7 household members) and on average had more children under 15 than adults, and about half of households were polygynous. The male respondent was about 10 years older than the female respondent on average. Most men and women respondents did not speak French and were not literate in the local language (Table 2).

Table 2: Household and individual characteristics at baseline

	Control		Treatment		p-value
	Mean	n	Mean	n	
Household size	8.69	890	8.71	873	0.923
Dual adult household	0.97	890	0.98	873	0.281
Dependency ratio	1.35	890	1.34	873	0.519
Number of children under 15	4.66	890	4.61	873	0.713
Age of woman	33.31	885	33.34	871	0.954
Age of man	43.70	777	44.06	774	0.570
Woman is married	0.98	883	0.97	871	0.184
Man is married	0.98	777	0.97	774	0.319
Woman speaks French	0.09	883	0.09	871	0.943
Man speaks French	0.25	777	0.22	774	0.200
Woman is literate in local language	0.05	883	0.08	871	0.009*
Man is literate in local language	0.13	777	0.12	774	0.456
Polygynous	0.46	885	0.47	871	0.683
Woman was pregnant in last two years	0.47	884	0.45	871	0.472
Woman has child under 2	0.36	884	0.35	871	0.751

* $p<0.05$

Empowerment of both women and men was low at baseline. Woman achieved adequacy in about half of the 12 indicators of empowerment, and about 10 percent of women were empowered; men achieved adequacy in about two thirds of the 12 indicators of empowerment, and just under half of men were empowered. Few households achieved gender parity, meaning that women were rarely empowered or as empowered as the man in their household. Across all 12 indicators of empowerment, a higher

proportion of men than woman achieved adequacy. Most men and women had adequate input in productive decisions, ownership of land and other assets, respect among household members, and control over use of income. Most men and women did not have adequate access to and control over financial services, group membership, and membership in influential groups. The gap between men and women was largest for work balance, where about 30 percent of women had work balance (meaning that they were not overworked), while about 75 percent of men experienced work balance (Table 3).

Table 3: Women's and men's empowerment at baseline

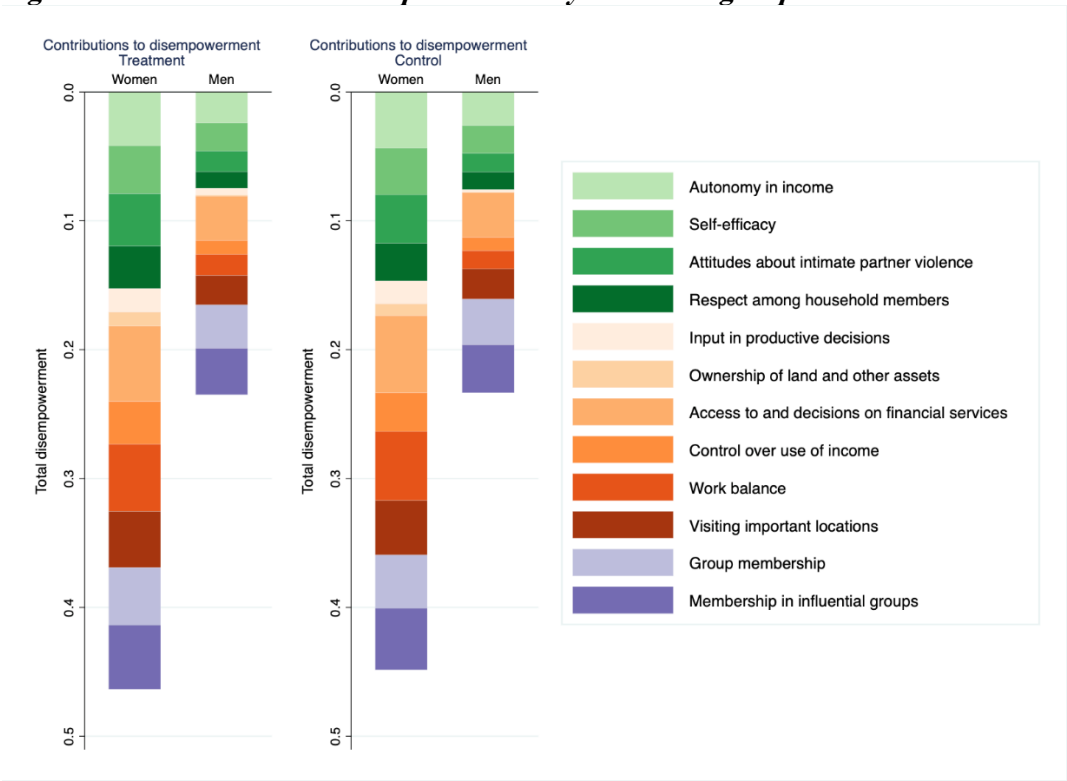
	Control		Treatment		p-value
	Mean	n	Mean	n	
Empowerment score (woman)	0.52	754	0.51	721	0.105
Empowerment score (man)	0.68	634	0.69	657	0.090
Empowered (woman)	0.12	754	0.09	721	0.029*
Empowered (man)	0.43	634	0.47	657	0.187
Empowerment gap (household)	0.17	610	0.18	627	0.113
Gender parity (household)	0.28	610	0.24	627	0.099
Autonomy in income (woman)	0.58	885	0.57	871	0.631
Autonomy in income (man)	0.68	777	0.68	773	0.798
Self-efficacy (woman)	0.45	885	0.43	871	0.273
Self-efficacy (man)	0.59	777	0.63	773	0.092
Attitudes about IPV (woman)	0.52	885	0.55	871	0.222
Attitudes about IPV (man)	0.66	777	0.71	773	0.038*
Respect among household members (woman)	0.64	854	0.68	844	0.118
Respect among household members (man)	0.71	732	0.71	767	0.966
Input in productive decisions (woman)	0.79	885	0.80	871	0.471
Input in productive decisions (man)	0.96	777	0.95	773	0.109
Ownership of land and other assets (woman)	0.83	885	0.84	871	0.346
Ownership of land and other assets (man)	0.99	777	0.99	773	0.443
Access to and decisions on financial services (woman)	0.20	885	0.21	871	0.866
Access to and decisions on financial services (man)	0.38	777	0.45	773	0.007*
Control over use of income (woman)	0.67	885	0.67	871	0.905
Control over use of income (man)	0.87	777	0.87	773	0.85
Work balance (woman)	0.31	782	0.31	746	0.865
Work balance (man)	0.76	679	0.74	663	0.313
Visiting important locations (woman)	0.51	885	0.55	871	0.175
Visiting important locations (man)	0.73	777	0.74	773	0.688
Group membership (woman)	0.40	885	0.29	871	<0.001*
Group membership (man)	0.44	777	0.43	773	0.565
Membership in influential groups (woman)	0.30	885	0.24	871	0.007*
Membership in influential groups (man)	0.37	777	0.40	773	0.333
Decides on own health and diet (woman)	0.62	884	0.54	871	<0.001*

	Control		Treatment		p-value
	Mean	n	Mean	n	
Decides on health and diet during pregnancy (woman)	0.72	414	0.78	393	0.077
Decides on child's diet (woman)	0.81	884	0.80	871	0.526
Decides on weaning and breastfeeding (woman)	0.97	318	0.95	307	0.483
Decides on seeking healthcare (woman)	0.85	764	0.85	742	0.755
Decides on purchasing food and health products (woman)	0.06	890	0.05	873	0.092
Access to food and health products (woman)	0.31	890	0.37	873	<0.001*

* p<0.05

The pro-WEAI results were also used to assess how much each indicator of empowerment contributed to women's and men's disempowerment. For both women and men, the largest contributors to disempowerment in the study population were access to and decisions on financial services, work balance, and membership in influential groups (Figure 1).

Figure 1: Contributors to disempowerment by treatment group



Note: The figure compares the depth of disempowerment among women and men in the treatment and control groups; longer bars indicate higher levels of disempowerment. It also depicts the breakdown of the largest contributors to disempowerment among these same groups; the contribution of each indicator is depicted by a different color.

Descriptive analyses revealed few changes in women's and men's empowerment between baseline and endline. There were small increases in the percentage of women and men adequate in self-efficacy (1.09 and 0.95 percentage points (pp) increase, respectively), a small decrease in the percentage of men adequate in autonomy in income (-1.54 pp), and a small increase in the percentage of households that achieved gender parity (3.34 pp).

3.2 Impact estimates

In terms of treatment effects, ANCOVA models revealed that there was no significant impact of the SELEVER program at endline on women's or men's empowerment when looking at the aggregate empowerment score or the binary empowered variable (Table 4). Additionally, there were no significant impacts on gender parity or the empowerment gap between women and men in the same household.

Table 4: Treatment effect estimates: aggregate empowerment indicators

	(1)	(2)	(3)	(4)	(5)	(6)
	Empowerment score (women)	Empowerment score (men)	Empowered (women)	Empowered (men)	Empowerment gap	Gender parity
Treatment	-0.01	-0.00	0.00	-0.00	0.01	-0.00
	(0.01)	(0.01)	(0.02)	(0.04)	(0.01)	(0.03)
Observations	1,487	1,396	1,487	1,396	1,327	1,327
R-squared	0.011	0.006	0.003	0.007	0.012	0.007

Robust standard errors in parentheses
In Columns 1-4 treatment estimates control for household size and age of respondent.
In Columns 5-6 treatment estimates control for household size and age of female respondent in the household.
* $p<0.0083$ (threshold adjusted using Bonferroni correction for 6 tests)

The aggregate pro-WEAI indicators provide an overall view on empowerment, but they may mask changes in different directions for the individual indicators. Thus, in the next part of the analysis, we look more carefully at the individual indicators (both binary and continuous), as well as the aspects of these indicators that specifically pertain to poultry rearing. After adjusting for multiple comparisons, there

were no significant impacts on women's or men's empowerment when looking at the individual binary indicators that comprise pro-WEAI (Tables 5) or indicators of empowerment in nutrition and health (Table 6), count indicators of empowerment (Tables 7), or poultry-related indicators of empowerment (Tables 8). (Prior to applying Bonferroni corrections, the only significant impact was a decrease in women's perception of mutual respect among household members.) Of note, there is reason for the null finding related to women's work balance to be interpreted in a positive light. The SELEVER intervention included multiple activities that could have increased women's time burden, and the program also focused on raising awareness of women's time burden among men and community members. Thus, the lack on negative impact on work balance may be the result of programmatic efforts to mitigate the intervention's burden on women's time.

3.3 Supplementary analysis

We conducted supplementary analyses to examine the robustness of these findings. Using propensity score weighted regression analysis, we considered, separately, whether the program had an impact among those who participated in the nutrition and gender component and among those who participated in SELEVER as a whole. The only positive estimated average treatment effect, after accounting for multiple hypothesis testing, was an increase in membership in influential groups among women who participated in SELEVER as a whole (Appendix Table A1). This finding is logical given that the poultry portion of the intervention was delivered via poultry producer groups. After accounting for multiple hypothesis testing, there were no additional impacts on other indicators or by participation in the nutrition and gender component.

Additionally, we looked at the heterogeneity of impact by examining whether there were differential impacts between those who owned large (>20) compared to small flocks. After accounting for multiple hypothesis testing, we did not find significant impacts on any of the empowerment outcomes (Appendix Table A2).

Table 5: Treatment effect estimates: core pro-WEAI indicators for women and men

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Autonomy in income	Self-efficacy	Attitudes about IPV	Respect among household members	Input in productive decisions	Ownership of land and other assets	Access to and decisions on financial services	Control over use of income	Work balance	Visiting important locations	Group membership	Membership in influential groups
Panel A: Women												
Treatment	0.05	-0.01	-0.03	-0.05	0.01	-0.01	0.03	-0.03	0.01	-0.01	-0.04	-0.02
	(0.03)	(0.03)	(0.04)	(0.03)	(0.03)	(0.02)	(0.02)	(0.04)	(0.03)	(0.03)	(0.03)	(0.03)
Observations	1,624	1,624	1,624	1,487	1,624	1,624	1,624	1,624	1,624	1,624	1,624	1,624
R-squared	0.003	0.008	0.007	0.008	0.006	0.001	0.004	0.007	0.029	0.001	0.006	0.006
Panel B: Men												
Treatment	0.01	-0.03	-0.04	-0.01	-0.03	-0.01	0.03	0.00	-0.03	-0.02	0.05	0.04
	(0.03)	(0.03)	(0.02)	(0.03)	(0.01)	(0.01)	(0.04)	(0.02)	(0.03)	(0.03)	(0.04)	(0.04)
Observations	1,472	1,472	1,472	1,400	1,472	1,472	1,472	1,472	1,467	1,472	1,472	1,472
R-squared	0.000	0.067	0.003	0.002	0.009	0.008	0.012	0.006	0.025	0.008	0.009	0.007

Robust standard errors in parentheses

Treatment estimates control for household size and age of respondent.

* $p<0.0042$ (threshold adjusted using Bonferroni correction for 12 tests)

Table 6: Treatment effect estimates: indicators of nutrition and health agency, women

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Respondent decides on…	Own health and diet	Health and diet during pregnancy	Child's diet	Weaning and breastfeeding	Seeking healthcare	Purchasing food and health products	Access to food and health products
Treatment	-0.00	-0.04	-0.01	-0.00	0.02	0.01	0.02
	(0.03)	(0.06)	(0.03)	(0.03)	(0.02)	(0.03)	(0.03)
Observations	1,624	254	1,624	553	1,125	1,626	1,626
R-squared	0.000	0.007	0.001	0.000	0.014	0.004	0.002

Robust standard errors in parentheses
Treatment estimates control for household size and age of respondent.
* $p<0.0071$ (threshold adjusted using Bonferroni correction for 7 tests)

Table 7: Treatment effect estimates: count versions of core pro-WEAI indicators

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
	New General Self-Efficacy score	Number of violence situations	Number of production decisions	Number of assets owned	Number of credit sources	Number of income decisions	Hours spent on work	Number of visit locations	Number of groups	Number of influential groups
Panel A: Women										
Treatment	-0.30	-0.07	-0.56	-0.04	0.03	-0.43	-0.05	0.05	-0.03	-0.01
	(0.32)	(0.12)	(0.47)	(0.13)	(0.03)	(0.43)	(0.35)	(0.06)	(0.05)	(0.04)
Observations	1,624	1,624	1,574	1,624	1,624	1,624	1,624	1,626	1,624	1,624
R-squared	0.014	0.006	0.007	0.007	0.003	0.007	0.010	0.002	0.006	0.006
Panel B: Men										
Treatment	0.03	-0.04	-0.57	-0.01	0.09	-0.38	0.00	0.05	0.11	0.11
	(0.27)	(0.06)	(0.41)	(0.21)	(0.07)	(0.36)	(0.41)	(0.07)	(0.06)	(0.06)
Observations	1,472	1,472	1,462	1,472	1,472	1,472	1,467	1,472	1,472	1,472
R-squared	0.093	0.002	0.025	0.011	0.013	0.024	0.037	0.013	0.008	0.008

Robust standard errors in parentheses
Treatment estimates control for household size and age of respondent.

* $p<0.005$ (threshold adjusted using Bonferroni correction for 10 tests)

Table 8: Treatment effect estimates: Poultry-specific empowerment indicators

	(1)	(2)	(3)	(4)
	Decisions on poultry production	Owns poultry	Decisions on poultry income	Hours on poultry work
Panel A: Women				
Treatment	0.07	0.09	0.22	0.00
	(0.24)	(0.05)	(0.25)	(0.00)
Observations	1,093	1,624	1,093	1,624
R-squared	0.013	0.018	0.011	0.001
Panel B: Men				
Treatment	-0.02	-0.02	0.02	0.02
	(0.06)	(0.02)	(0.06)	(0.03)
Observations	1,362	1,472	1,362	1,467
R-squared	0.002	0.015	0.003	0.006

Robust standard errors in parentheses
Treatment estimates control for household size and age of respondent.

* p<0.0125 (threshold adjusted using Bonferroni correction for 4 tests)

3.4 Summary of qualitative methods and findings

The SELEVER study also conducted in-depth qualitative gender research near the midpoint of the SELEVER intervention. The findings from these studies have been reported elsewhere (Eissler et al., 2020a, 2020b). In this section we summarize the methods and key results from the qualitative work that can be triangulated with the quantitative findings presented above.

Qualitative data were collected in six purposefully selected SELEVER communities across five provinces. Data collection in each village included four sex-disaggregate focus groups (two on gender norms, and two on nutrition and food production and allocation) and semi-structured interviews were conducted with a man and a woman from two different households. Additionally seasonal calendars were conducted in half the villages and key-informant interviews were conducted with 13 group leaders, 10 VVVs, and six poultry traders. The discussion guides for the focus groups and interviews were heavily informed by the pro-WEAI qualitative protocols (Meinzen-Dick et al., 2019), and the nutrition and food production and allocation focus group was informed by vignettes developed by Elias and colleagues (2018).

Overall, the qualitative work concludes that at the midpoint of the program there were some small changes related to women's empowerment and gender norms that participants attributed to the program. Firstly, men often acknowledged, and attributed to SELEVER, their awareness of the common division of labor that burdens women's time, the importance of discussing important decisions with their wives, and the importance of women's economic contributions to the household (Eissler et al., 2020b). This finding is in line with the interpretation that the null effect on work balance can be interpreted as the project's successful mitigation of women's increased work due to the intervention.

Additionally, participants describe increased acceptance of women in public places, such as markets, which has coincided with the SELEVER program, but that community members did not specifically attribute to the program (Eissler et al., 2020b). Part of the shift in accepting women in public spaces may be attributable to the cadre of women VVVs that were trained by SELEVER (Eissler et al.,

2020a, 2020b). Given the lack of impact on the frequency of women visiting important places, it seems that these changes in men's perceptions and the behaviors of some women in the community did not trickle down to actual changes in household gender relationships during the period covered by the study. Overall, evidence from the qualitative study concludes that although SELEVER has led to some gender-related changes, they may be relatively small-scale changes in terms of moving the needle on women's empowerment.

4. DISCUSSION

Our results provide rigorous evidence that SELEVER, a multisectoral gender- and nutrition-sensitive intervention that focused on the poultry value chain in western Burkina Faso, did not lead to measurable increases in women's empowerment across program beneficiaries. The one exception to this is that the null finding on women's work balance suggests that the intervention may have been able to mitigate women's increased labor burden due to the intervention. The lack of impact on women's empowerment occurs even though the program implemented a range of gender-sensitive strategies (Johnson et al., 2018) and despite measuring women's empowerment using the pro-WEAI, which is sensitive enough to detect impact in similar types of projects with comparable or smaller sample sizes(A. Quisumbing et al., 2022; Seymour et al., 2022). Additionally, we conducted supplementary analyses in which we analyzed the effects of treatment on the treated (i.e., only examined effects among those who participated in the program, as opposed to those who were targeted for the program) and examined heterogeneous impacts by flock size; similarly, we found no impact on women's empowerment. These results leave unanswered questions as to why there were no detectable impacts on women's empowerment. In this discussion we consider potential explanations for the null findings. We elaborate these explanations with supporting qualitative evidence from SELEVER, recent findings from other gender-sensitive agricultural development projects, and the results of the primary trial outcomes published elsewhere (Becquey et al., 2022; Leight et al., 2022).

4.1 Explanations for null results

We consider three potential explanations for SELEVER's lack of impact on women's empowerment. First, SELEVER may have used too light of a touch in its intervention, a hypothesis that has also been considered as an explanation for the limited impact on poultry production (Leight et al., 2022). Second, there are high levels of disempowerment in the study population, and SELEVER may not have targeted the domains of empowerment where women are most disempowered. Finally, the study population may have been too poor to fully invest in the demands of the market-oriented intervention. Yet, despite the

high levels of poverty in the study area, SELEVER did not transfer assets, further limiting the potential for impact. We explore each of these explanations in greater depth.

The first explanation for the lack of program impact is that SELEVER may have been too light in terms of the depth of activities delivered, as well as participation by intended beneficiaries. SELEVER primarily delivered information to producers and consumers to strengthen market linkages and chose to focus on providing a lighter intervention with small amounts of exposure to these services to a larger number of beneficiaries, instead of targeting fewer beneficiaries more intensely. The results of SELEVER's impact on poultry production outcomes demonstrate that participation in many of the program components was low and that there were only small impacts on poultry production outcomes (Leight et al., 2022). The gender trainings and women's empowerment component of the intervention was most closely integrated into the delivery of the nutrition component, but also aimed to cut across other aspects of the design, especially in terms of the gender-sensitive nature of the project's approach to increasing women's involvement in and empowerment from poultry production. However, the lack of integrated coverage of program components may have limited the potential for program impacts on women's empowerment.

Another explanation is that, although SELEVER used a carefully considered multipronged approach for increasing women's empowerment, it may not have targeted the areas of empowerment where women were most disempowered and that could have had the biggest influence on women's lives. In decomposing the contributors to disempowerment using the pro-WEAI, we found that the three largest areas of disempowerment for women in the study area at baseline were "access to and decisions on credit and financial services," "work balance," and "membership in influential groups." Although SELEVER aimed to link women with existing credit sources, this aspect of the program was not particularly successful, as no impact was found on women taking loans (Leight et al., 2022). Qualitative data suggested that the size and terms of the loans available via SELEVER partners were often not agreeable to women who sought these loans, often because payments were due at times that did not coincide with when women made profits from poultry rearing (Eissler et al., 2020a). Additionally, women must often

seek their husband's permission to participate in savings and loans groups, and men often request that their wives take loans for men's own use (Eissler et al., 2020a).

Additionally, the potential of a market-focused intervention like SELEVER to empower women relies a great deal on women's ability to maintain control over the income they are generating. The qualitative study results found that it may have been difficult for women to maintain strong control over poultry-related income. Women in SELEVER communities indicated that the most common source of disagreement with their spouses was how to manage and invest income, especially poultry income (Eissler et al., 2020b). Regardless of who is involved in poultry rearing activities, it is considered the male household head's decision whether to slaughter or kill a chicken, and a woman would not be able to do so without her husband's permission, even if she owned the chicken (Eissler et al., 2020a). It is commonly expected in the study area that women would receive the income from any of her poultry sold by her husband and that she can allocate it to specific needs in the household. In practice, however, she may have limited overt control over this income, especially when her husband knows the amount and when she received it.

A final explanation for the lack of impact on women's empowerment may be that the depth of both disempowerment and poverty in Burkina Faso are too much to overcome in the scope of a community-level development project that functions over a relatively short period and at relatively low intensity, especially when that intervention does not provide asset transfers. As described earlier in this paper, Burkina Faso consistently ranks in the bottom 10 countries according to the Human Development Index and that women's educational attainment and literacy are low, while the acceptability of wife beating is high. However, projects that take place in countries with similarly low levels of human development and poor conditions for women have demonstrated impacts on women's empowerment (Benali et al., 2020; Hillesland et al., 2022; Janzen et al., 2018; A. Quisumbing, Ahmed, et al., 2021). Additionally, other projects implemented in Burkina Faso have led to measurable impacts on women's empowerment (Heckert et al., 2019; Olney et al., 2015). Thus, although Burkina Faso is an exceptionally

challenging environment, it is unlikely that these characteristics alone can explain the lack of impact of SELEVER on women's empowerment.

Additionally, SELEVER did not address financial barriers, as it did not directly transfer assets to beneficiaries. In low-income settings, targeted asset transfers have previously been shown to be an essential, but not sufficient, approach for ensuring that agricultural development programs empower women and that gender-sensitive approaches can help women maintain control over these assets (A. R. Quisumbing et al., 2015; Roy et al., 2015; van den Bold et al., 2015). In fact, most small-holder agricultural interventions in Burkina Faso include some sort of asset transfer. Helen Keller International's Enhanced Homestead Food Production program is one such model, which provided women beneficiaries with two chickens and basic agricultural implements for cultivation. Evaluations of this program found that women in study arms that received assets were able to maintain control over these assets and attained higher levels of empowerment; moreover, attitudes in the wider community become more favorable towards women's asset ownership (Olney et al., 2015; van den Bold et al., 2015) The asset transfer debate is important, as funders and implementers are often concerned about avoiding "give-away" programs. Such programs may be costly to implement, and there are often concerns that beneficiaries will become dependent on program handouts (Gautam, 2019; Handa et al., 2018; Lentz et al., 2005). SELEVER was a market-based intervention that targeted relatively poor households in an exceptionally resource poor context. The program wagered much of its success on whether small-scale producers were willing to invest their own funds in infrastructure (e.g., henhouses) and veterinary care. Most households in SELEVER communities had very little to invest, especially for a risky investment (poultry mortality is high) (Leight et al., 2022). While concerns about asset transfers being too generous may be appropriate in some contexts, in the case of SELEVER women may have been more willing to invest in poultry if they had the resources to support doing so. Labeling these assets as "women's" may have helped women maintain active control over the assets as has been demonstrated in the design of some financial tools (Buvinic & o'Donnell, 2016; O'Sullivan, 2017). Overall, it may be important to reframe concerns about

interventions that include asset-transfer in terms of the types of contexts or programs where asset transfers can make an important and meaningful difference in program outcomes.

4.2 Conclusions

We can reflect on outcomes from across the SELEVER trial using the Reach-Benefit-Empower Framework. The framework classifies gender-sensitive strategies in terms of whether they reach (e.g., include them in program activities), benefit (e.g., increase income or improve nutritional status), or empower women (increase their ability to make strategic life choices) (Johnson et al., 2018). In terms of reaching women, approximately half of households reported attending a SELEVER training in the 2019 survey (while implementation was in progress) and approximately 30% reported having attended a SELEVER training in the 2020 endline survey (Leight et al., 2022). Evidence from the analysis of the poultry-related primary outcomes of the trial highlighted substantial positive effects of SELEVER on production of poultry owned by women (Leight et al., 2022). However, these positive effects were counterbalanced by negative effects for poultry that was jointly owned by women and men (and weakly positive effects for poultry owned by men). This suggests some "relabeling" with households, in which exposure to the SELEVER intervention resulted in women identifying previously jointly owned poultry as their own. This finding is suggestive of small, measurable benefits to women. On the other hand, there was no impact on women's diets (Becquey et al., 2022). In terms of empowerment, however, in this work, we determine that there were no measurable shifts in women's empowerment. Overall, SELEVER did an adequate job reaching women; was able to provide some benefits in the area of poultry production, but not for women's diets; but there is no evidence that the program empowered women.

Considering SELEVER's lack of impact on women's empowerment and potential reasons for these outcomes, it is worth focusing on the overarching question of whether a food systems intervention can empower women. As highlighted in the emerging literature on this topic, there is evidence that gender-sensitive food systems interventions that focus on marketing have the potential to benefit women in terms of their livelihoods and potentially empower women (Johnson et al., 2018; A. Quisumbing,

Heckert, et al., 2021). In the case of SELEVER, we see some evidence of benefits to women in terms of poultry-related outcomes, but no impact on women's empowerment (Leight et al., 2021, 2022). Despite increasing focus on women's empowerment as a development objective, especially among rural agriculture and food systems interventions, many interventions like SELEVER fail to achieve detectable impacts on women's empowerment, despite multipronged approaches to addressing gender inequalities. The lack of impact may be attributable to low intensity of program exposure, limited integration among the different program components, the possibility that the project did not target key areas of women's empowerment necessary for change in the context of the project, and the absence of a targeted asset transfer to bolster poultry production in the context of high levels of poverty.

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APPENDIX

Table A. 1: Estimated treatment on the treated using propensity score weighted regression

Indicator	Propensity scores using engagement in nutrition & gender			Propensity scores using engagement in SELEVER		
	Treatment estimate	Standard error	n	Treatment estimate	Standard error	n
Empowerment score (women)	0.011	0.015	2857	0.022	0.023	2857
Empowerment score (men)	0.012	0.014	2591	0.016	0.023	2591
Empowered (women)	0.000	0.034	2857	0.098	0.066	2857
Empowered (men)	0.029	0.052	2591	-0.042	0.082	2591
Empowerment gap	0.003	0.019	2483	0.003	0.029	2483
Gender parity	0.008	0.046	2483	0.055	0.080	2483
Autonomy in income (women)	0.009	0.040	3246	-0.025	0.073	3246
Autonomy in income (men)	-0.077	0.052	2906	-0.015	0.070	2906
Self-efficacy (women)	-0.011	0.051	3246	-0.057	0.074	3246
Self-efficacy (men)	-0.061	0.042	2906	-0.022	0.075	2906
Attitudes about IPV (women)	-0.108*	0.045	3246	-0.047	0.064	3246
Attitudes about IPV (men)	-0.089*	0.039	2906	-0.062	0.062	2906
Respect among household members (women)	-0.065	0.046	3066	-0.102	0.074	3066
Respect among household members (men)	0.025	0.050	2792	-0.003	0.070	2792
Input in productive decisions (women)	0.061	0.042	3246	0.029	0.045	3246
Input in productive decisions (men)	-0.028	0.018	2906	-0.026	0.024	2906
Ownership of land and other assets (women)	0.017	0.034	3246	0.012	0.048	3246
Ownership of land and other assets (men)	-0.001	0.005	2906	-0.001	0.004	2906
Access to and decisions on financial services (women)	0.024	0.038	3246	-0.015	0.065	3246
Access to and decisions on financial services (men)	0.038	0.043	2906	0.024	0.082	2906
Control over use of income (women)	0.044	0.047	3246	0.050	0.063	3246
Control over use of income (men)	0.014	0.029	2906	0.047	0.053	2906

Indicator	Propensity scores using engagement in nutrition & gender			Propensity scores using engagement in SELEVER		
	Treatment estimate	Standard error	n	Treatment estimate	Standard error	n
Work balance (women)	0.020	0.046	3032	0.032	0.073	3032
Work balance (men)	0.027	0.051	2704	-0.036	0.085	2704
Visiting important locations (women)	0.109	0.055	3246	0.013	0.072	3246
Visiting important locations (men)	0.062	0.041	2906	0.028	0.062	2906
Group membership (women)	0.056	0.038	3246	0.173*	0.064	3246
Group membership (men)	0.140*	0.047	2906	0.178*	0.073	2906
Membership in influential groups (women)	0.048	0.040	3246	0.232**	0.068	3246
Membership in influential groups (men)	0.09	0.047	2906	0.121	0.071	2906
Decides on own health and diet (women)	-0.101	0.052	3245	-0.192*	0.087	3245
Decides on health and diet during pregnancy (women)	-0.116	0.091	1001	-0.150	0.150	1001
Decides on child's diet (women)	-0.081	0.044	3245	-0.077	0.080	3245
Decides on weaning and breastfeeding (women)	-0.011	0.033	1128	-0.033	0.051	1128
Decides on seeking healthcare (women)	-0.077*	0.032	2518	-0.140*	0.051	2518
Decides on purchasing food and health products (women)	-0.045	0.026	3248	0.006	0.045	3248
Access to food and health products (women)	-0.072	0.060	3248	-0.115	0.060	3248

*p<0.05, **p<0.0014 (threshold adjusted using Bonferroni correction for 37 tests)

Notes: Estimates shown are estimated treatment impact on the treated using difference-in-difference estimation with treated individual identified using propensity scores. The left columns show results using propensity scores based on engagement in the nutrition and gender components of SELEVER; the right columns show results using propensity scores based on engagement in the full SELEVER intervention. Standard errors are clustered at the commune level. N indicates total number of observations in the difference-in-differences estimation.

Table A. 2: Estimated program impacts adjusting for poultry flock size

Indicator	Treatment	Standard error	Large producer (>=20 mature birds)	Standard error	Interaction term (treatment X large producer)	Standard error	n
Empowerment score (women)	-0.007	0.016	-0.013	0.015	-0.009	0.020	1492
Empowerment score (men)	-0.002	0.016	-0.008	0.013	0.002	0.018	1398
Empowered (women)	0.022	0.025	0.024	0.021	-0.044	0.033	1492
Empowered (men)	-0.028	0.044	-0.030	0.036	0.056	0.053	1398
Empowerment gap	0.011	0.017	0.005	0.018	0.000	0.026	1328
Gender parity	0.019	0.035	0.012	0.038	-0.046	0.055	1328
Autonomy in income (women)	0.039	0.041	-0.024	0.031	0.024	0.047	1630
Autonomy in income (men)	0.009	0.036	-0.049	0.034	0.013	0.048	1474
Self-efficacy (women)	-0.007	0.042	-0.025	0.041	0.000	0.057	1630
Self-efficacy (men)	-0.029	0.033	-0.002	0.032	-0.004	0.042	1474
Attitudes about IPV (women)	-0.026	0.048	-0.044	0.038	-0.008	0.054	1630
Attitudes about IPV (men)	-0.025	0.035	0.009	0.036	-0.026	0.052	1474
Respect among household members (women)	-0.039	0.030	0.014	0.038	-0.027	0.049	1492
Respect among household members (men)	-0.017	0.035	-0.023	0.034	0.018	0.047	1402
Input in productive decisions (women)	-0.005	0.037	-0.046	0.033	0.027	0.045	1630
Input in productive decisions (men)	-0.029	0.018	-0.012	0.014	-0.010	0.020	1474
Ownership of land and other assets (women)	-0.012	0.023	0.020	0.024	-0.003	0.033	1630
Ownership of land and other assets (men)	-0.008	0.007	0.003	0.003	0.000	0.008	1474
Access to and decisions on financial services (women)	0.053	0.031	0.007	0.030	-0.055	0.042	1630
Access to and decisions on financial services (men)	0.024	0.048	-0.005	0.034	0.014	0.043	1474
Control over use of income (women)	-0.028	0.049	-0.019	0.041	-0.001	0.060	1630
Control over use of income (men)	0.005	0.029	-0.048	0.029	-0.003	0.036	1474

Indicator	Treatment	Standard error	Large producer (>=20 mature birds)	Standard error	Interaction term (treatment X large producer)	Standard error	n
Work balance (women)	0.039	0.038	0.017	0.035	-0.058	0.042	1630
Work balance (men)	-0.022	0.047	0.003	0.039	-0.009	0.056	1469
Visiting important locations (women)	0.042	0.035	0.055	0.040	-0.118*	0.051	1630
Visiting important locations (men)	0.026	0.035	0.056	0.047	-0.096	0.059	1474
Group membership (women)	-0.064	0.043	-0.042	0.038	0.061	0.052	1630
Group membership (men)	0.019	0.042	-0.012	0.032	0.071	0.048	1474
Membership in influential groups (women)	-0.050	0.040	-0.051	0.039	0.067	0.055	1630
Membership in influential groups (men)	0.010	0.044	-0.018	0.036	0.069	0.051	1474
Decides on own health and diet (women)	0.048	0.039	0.026	0.034	-0.109*	0.054	1630
Decides on health and diet during pregnancy (women)	-0.033	0.074	0.004	0.074	0.006	0.108	256
Decides on child's diet (women)	0.018	0.034	0.051	0.032	-0.064	0.047	1630
Decides on weaning and breastfeeding (women)	-0.017	0.032	0.013	0.031	0.025	0.045	556
Decides on seeking healthcare (women)	0.025	0.022	0.013	0.022	-0.027	0.028	1128
Decides on purchasing food and health products (women)	0.003	0.030	-0.012	0.028	0.024	0.039	1632
Access to food and health products (women)	0.016	0.041	-0.039	0.034	0.012	0.046	1632

*p<0.05, **p<0.0014 (threshold adjusted using Bonferroni correction for 37 tests)

Notes: Estimates shown are treatment effect estimates using analysis of covariance models, controlling for whether the household was a large poultry producer (20 birds or more) and the interaction between treatment and large producer. Models also control for household size and age of respondent. Standard errors are clustered at the commune level.

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