



INITIATIVE ON
Gender Equality



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Do Empowerment Impacts Endure?

The Medium-Term Impacts of the Agriculture, Nutrition, and Gender Linkages (ANGeL) Project in Bangladesh

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1. Introduction

Whether impacts of development interventions are sustainable has attracted much recent interest (examples include Bandiera et al., 2017, Banerjee et al., 2021, Blattman et al., 2020, Carneiro et al., 2021, Grisolia, 2024, and Haushofer and Shapiro, 2018). When interventions involve trained facilitators, for example, it is of interest to know whether effects persist once these facilitators are no longer delivering the message (Ahmed et al, forthcoming). The recognition of women's empowerment and gender equality as intrinsically important has spawned a growing literature on the impacts of development interventions on women's empowerment (Quisumbing et al. 2023, Quisumbing et al. 2024) and attitudes towards gender roles (Alderman et al. 2025). Yet, with few exceptions (Alderman et al. 2025) there is little overlap between these two areas of work, in large part because many impact evaluations fail to follow up after the initial evaluation is completed. A synthesis of findings from a portfolio of 11 agricultural development projects in South Asia and Africa suggests that, while projects are able to affect aspects of empowerment such as decisionmaking over resources and control over income, changes in gender norms are more difficult to achieve in the two to three year time span over which impact evaluations are typically conducted (Quisumbing et al. 2024). If women's empowerment interventions aim ultimately to change gender norms, to detect impacts, they should be measured over a sufficiently long period of time to allow for norm change.

We take advantage of a unique opportunity to contribute to both literatures using a follow-up survey of households in the Agriculture, Nutrition, and Gender Linkages (ANGeL) project in Bangladesh, which had significant short-term impacts on agricultural production diversity, dietary diversity, and women's empowerment (Ahmed et al. 2023a, 2023b, Quisumbing et al. 2021). ANGeL was a cluster randomized controlled trial that tested combinations of agricultural training, nutrition behavioral change communication, and gender sensitization, delivered by government agricultural extension workers (and local trained women in one treatment arm) delivered jointly to husbands and wives. The impact evaluation conducted in 2018 found that while no treatment increased production diversification of crops grown on fields, treatment arms with agricultural training did increase the number of different crops grown in homestead gardens and the likelihood of any egg, dairy, or fish production but the magnitudes of these effect sizes were small. Nearly all treatment arms improved measures of food consumption and diet with the largest effects found when nutrition and agriculture training were combined. ANGeL also increased both women's and men's empowerment, raised the prevalence of households achieving gender parity, and led to small improvements in the gender attitudes of both women and men. There were significant increases in women's empowerment scores and empowerment status from all treatment arms but with no significant differences across these. Similar to the results on dietary quality and consumption, there is evidence that effects were greater when agriculture and nutrition treatments were combined (with or without gender sensitization training).

To assess whether ANGeL's impacts were sustained in the medium-term, we conducted a follow-up survey in 2022, four years after the endline survey and after the Covid-19 pandemic. Owing to budget constraints, we were only able to resurvey the agriculture, agriculture-nutrition, and agriculture-nutrition-gender treatment arms. Like the original impact evaluation, we assess impact using the project-level Women's Empowerment in Agriculture Index (Pro-WEAI) (Malapit et al. 2019). Pro-WEAI is based on information collected from both women and men within a household, allowing both men's and women's empowerment to be assessed. We examine whether: (1) empowerment impacts observed in 2018 were sustained in 2022; (2) what aspects of empowerment had more durable impacts (if at all); and (3) whether the intervention changed women's and men's workloads and attitudes toward gender roles.

2. Study Design

We first describe the intervention implemented between 2016 and 2018 and the follow-up conducted in 2022. Details about the intervention and findings from the original evaluation are found in Ahmed et al. (2023a, 2023b) and Quisumbing et al. (2021); details on the study design at follow-up are from Hoddinott et al. (2023).

2.1. Intervention¹

ANGeL aimed to assess three types of interventions that can leverage agricultural growth to increase farm household incomes, improve nutrition, and enhance women's empowerment in Bangladesh.

- 1) *Agriculture Production*: Facilitating the production of high-value food commodities that are rich in essential nutrients.
- 2) *Nutrition Knowledge*: Conducting high-quality behavior change communication (BCC) to improve nutrition knowledge of women and men.
- 3) *Gender Sensitization*: Undertaking gender sensitization activities that lead to the improvement in the status/empowerment of women and gender parity between women and men.

Accordingly, we implemented a clustered randomized controlled trial with the following arms:²

T-A: Agricultural Production training

T-N: Nutrition Behavior Change Communication (BCC)

T-AN: Agricultural Production training and Nutrition BCC

T-ANG: Agricultural Production training, Nutrition BCC, and Gender Sensitization

C: Control

Training associated with each treatment arm began in July 2016 (after the completion of the baseline survey in January 2016) and ended in December 2017 (before the endline survey which commenced in January 2018). The lecture-style training - supplemented by directed conversations, practical demonstrations and question-and-answer training formats - was usually held either in meeting rooms or in open courtyards in the villages where participants lived and was delivered to husbands and wives attending the sessions together. Each participant received a small stipend (125 Taka) to cover incidental costs associated with attending each training session, or 250 Taka per household per session if both the husband and wife participated. In each treatment village, 25 households took part in these trainings.

The agricultural production training (T-A), consisting of 17 sessions held over a 17-month period, was delivered by agricultural extension agents (AEAs) who are permanent employees of the Department of Agricultural Extension, an agency under the Bangladesh Ministry of Agriculture.³ The nutrition treatment arm (T-N) consisted of 19 sessions also held over a 17-month period, while participants in the agricultural production and nutrition (T-AN) treatment arm received the training covered in both the T-N and T-A treatments, for a total of 36 training sessions. Finally, agricultural production, nutrition, and gender sensitization (T-ANG) included all material covered in the T-AN treatment arm plus 8 additional sessions on gender sensitization. All sessions were designed for husbands and wives to attend together; in addition, the gender sensitization treatment also included key household

¹ This description draws from Quisumbing et al. (2021).

² There was an additional nutrition BCC treatment arm that used community women rather than agricultural extension agents (AEAs) to deliver the nutrition intervention. It is not used in this analysis, both because of less practical relevance (the Ministry of Agriculture plans to use its nationwide agricultural extension workforce to expand ANGeL across the country) and because it was not part of the bundled interventions that we compare to understand additive effects.

³ The curriculum and materials for the agricultural production training were developed by Helen Keller International (HKI) in collaboration with the Bangladesh Agricultural Research Institute (BARI) and the Bangladesh Rice Research Institute (BRRI).

decisionmakers and influencers such as mothers-in-law as participants in the gender sensitization training sessions.

2.2 Sampling Design of Original Impact Evaluation

Power calculations described in Quisumbing et al. (2021) showed that, relative to the control group, 25 clusters and 500 households were needed in each treatment arm to detect a 10% increase in empowerment. We then worked with officials at the Ministry of Agriculture to identify rural upazilas (sub-districts) that were agro-ecologically suitable for agricultural diversification and had good market connectivity. From a list of 484 such upazilas, we collaborated with the Ministry to purposively select 16 upazilas, such that each of the administrative divisions of Bangladesh were represented. Each upazila is divided into “blocks”; each block has an AEA. There were 525 blocks in these 16 upazilas. We randomly selected 10 blocks from each upazila, yielding 160 blocks. These were randomly assigned as follows: 25 blocks to each treatment arm described above; 35 blocks to the control group; and 25 blocks to the second BCC intervention described in footnote xx. We randomly selected one village from each block, then conducted a 100 percent census of households in each of the 160 selected villages. Thereafter, we listed all farm households with at least one child under 24 months from the village census lists. We randomly selected 25 farm households for each of the 160 blocks from village census lists of farm households with at least one child under 24 months, because child nutrition was also an outcome of interest. This yielded 625 households in each treatment arm (2,500 households in total) and 875 households in the control group, for a total sample of 3,375 households.

Baseline data were collected between November 2015 and January 2016. Endline data were collected between January and March 2018. In each household, both the primary female beneficiary and primary male beneficiary were interviewed. Although the male and female beneficiaries were interviewed separately, some modules were answered by only the male (e.g., household demographics, assets and wealth, agricultural production, non-food consumption and expenditures), some were answered by only the female (e.g., food consumption and food security indicators, dietary data, anthropometry, women’s status and decision-making autonomy, experience of IPV), and some were answered separately by each (e.g., data needed to construct the WEAI, gender attitudes, time preferences, agency). Several modules related to empowerment, gender attitudes, IPV, and experience with the program were administered only at endline. In the case of empowerment, the pro-WEAI (see below) was administered at endline but was not available at baseline as it was still under development; instead, at baseline, the abbreviated WEAI (A-WEAI, see Malapit et al. 2017) was fielded. Questions on gender attitudes and IPV were motivated in part by the *Nurturing Connections* curriculum, which was made available after baseline, thus were included only at endline.

2.3 Follow-Up: Sample and Attrition

Household-Level Attrition

The baseline sample included 3,994 households residing in 160 clusters. As we did not include the T-N(SAAO) and T-N(CNW) arms in this follow-up study (partly because the impact of these treatment arms had been small, see Ahmed et al. (2023a) and Ahmed et al. (2023b), and partly because the size of the survey budget meant that we had to prioritize those treatment arms where a priori, we would be most likely to observe sustainable effects), the relevant sample for the purposes of our participant flow diagram (Figure 1) are the 2,749 households in the T-A, T-AN, and T-ANG treatment arms and the control group. These households are found in 110 clusters. Between baseline and endline, 71 households attrit, leaving 2,678 households at endline. A further 77 attrited between the ANGeL endline and the 2022 survey, but we also were able to find and interview 43 households that had been interviewed as part of the ANGeL baseline but not endline. This yields a sample of 2,601 households in 110 clusters who were interviewed in all three rounds and 2,644 households that were interviewed at baseline and in 2022.

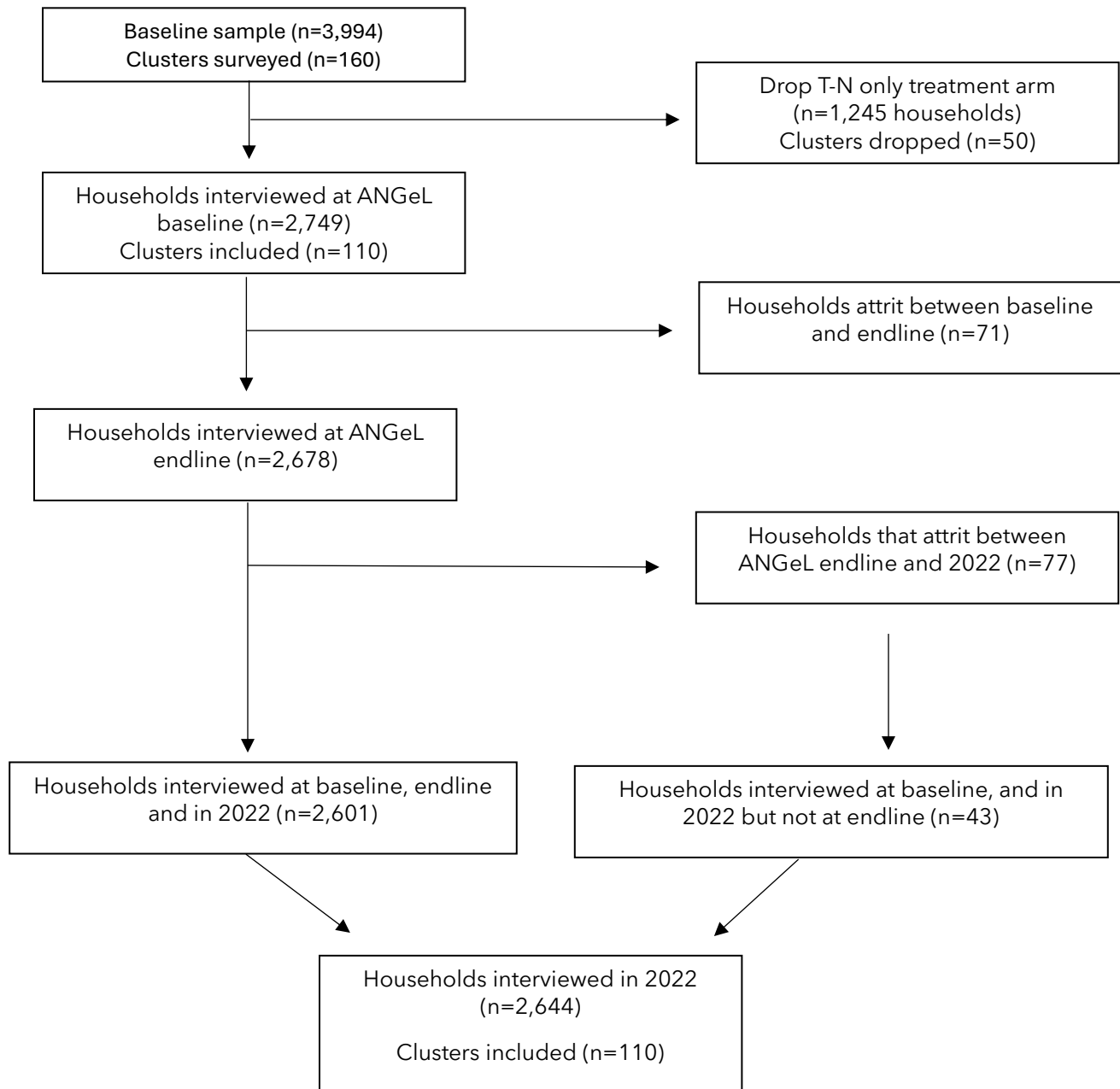
Attrition does not appear to differ markedly across treatment groups. We regress attrition status on treatment arms using a Linear Probability Model and clustering at the level of randomization, the block (Table 1), both without and with control variables. There is no indication that attrition over time is correlated with treatment assignment; the magnitudes of the point estimates are small, and none of the point estimates are statistically different from zero.

With the passage of time between the endline survey and the 2022 follow-up, some households split into two (or, much more rarely, three). When this occurred, we collected data on all these split households. However, for the purpose of this analysis, we “follow” the split household containing the individuals who participated in the ANGeL training. In the case of the control households, we “follow” the household containing the individuals who would have taken part in the training had they been included in a treatment group. Of the 2,644 households interviewed in 2022, 7.8 percent (206) are households that had split, and 92.2 percent (2438 households) never split. As was the case with attrition, there is no indication that the likelihood that household splits is correlated with treatment assignment; the magnitudes of the point estimates are small, and none of the point estimates are statistically different from zero (results available on request).

Individual-Level Attrition

Although households may remain in the sample, a relevant concern in the empowerment analysis is having the same sample of individuals who were interviewed in the baseline, endline, and follow-up rounds. When merging between WEAI modules by round, some individuals who were not in the baseline appear at endline and 2022, possibly because they were not interviewed for the WEAI module at baseline but were later administered the WEAI module. In some rounds, a different member from the same household was interviewed, so even though the household appears in the WEAI module, a different man or woman may have been interviewed across different rounds. If we restrict our sample only to the specific men and women (within the same household) administered all 3 rounds of the WEAI, then this restricted sample only has 1575 couples. We intend to conduct a separate attrition analysis on the individuals interviewed for the WEAI module.

Figure 1. ANGeL2, Participant Flow Diagram



Source: Authors

Table 1. Correlates of attrition

	(1)	(2)
	Treatment status only	Treatment status and control variables
Treatment		
Agriculture (A)	0.006 (0.014)	0.003 (0.010)
Agriculture & Nutrition (AN)	-0.013 (0.014)	-0.010 (0.010)
Agriculture, Nutrition and Gender (ANG)	-0.012 (0.015)	-0.006 (0.012)
R-squared	0.002	0.051
Sample size	2,749	2,749

Notes: Estimates are linear probability models where the dependent variable equals one if the household attrited between baseline and 2022. Standard errors adjusted for clustering at block level are in parentheses. *p<.10; **p<.05; ***p<.01. All specifications include as independent variables the treatment indicators. Column (2) also includes the following control variables: age and sex of household head, mean education levels of males and females 18 and older, number of adults, dependency ratio, wealth index, land owned at baseline, fishpond owned at baseline, baseline access to information as measured by (baseline) number of mobile phones owned, ownership of television, received extension visit for crop production, received extension visit for livestock or fish production, household has access to electricity, and baseline *upazila*.

Source: Authors

2.4 Statistical Methods

Our principal approach to evaluating the impact of ANGeL on empowerment takes advantage of the RCT design of the intervention. We estimate intent-to-treat (ITT) impacts. Because the empowerment outcomes were not measured using pro-WEAL at baseline (it was still under development), instead of using an ANCOVA specification (McKenzie 2012), we estimate the following:

$$Y_{ibt} = \alpha + \beta_A TA_b + \beta_{AN} TAN_b + \beta_{ANG} TANG_b + \beta_X X_{ibt-1} + \varepsilon_i \quad (2)$$

where Y_{ibt} is the outcome of interest for individual i residing in block b at time t ; TA_b , TAN_b , and $TANG_b$ are dummy variables that take the value of 1 if block b was assigned to T-A, T-AN, and T-ANG, respectively, and takes the value of 0 otherwise; X_{ibt-1} is a vector of baseline covariates; and ε_{ibt} is an error term. β_A , β_{AN} , and β_{ANG} represent the impact estimates for T-A, T-AN, and T-ANG, respectively.

All models include the following baseline covariates, intended to capture demographic and socioeconomic characteristics, human capital, land and labor availability, as well as access to information prior to intervention: age of household head, sex of household head, mean education level of males age 18 and older, mean education level of females age 18 and older, number of adults in the household, dependency ratio, wealth index, whether the household had access to electricity, amount of land owned at baseline, whether any fishponds were owned at baseline, the number of mobile phones owned, whether the household owned a television, whether the

household had recently received an extension visit for crop production, whether the household had recently received an extension visit for livestock or fish production, and dummies for baseline *upazila* (the geographic unit above the unit of randomization). We also include a dummy variable if the household reported being adversely affected by the widespread flooding that occurred in Bangladesh in the 12-month period prior to the endline survey.

Means and standard deviations of the baseline covariates for both the full and restricted samples are presented in Table 2.

Table 2. Baseline characteristics of households - by Treatment arm

	Control		T-A		T-AN		T-ANG	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age of household head	41.37	13.84	40.80	13.49	41.77	14.30	41.11	13.79
Female-headed household	0.03	0.17	0.04	0.19	0.04	0.20	0.05	0.22
Average years of education of male (18+)	4.79	3.88	4.68	4.03	4.19	3.68	4.73	3.57
Average years of education of female (18+)	5.17	2.87	5.38	2.99	4.54	2.75	5.15	2.68
Number of adults (>=18 years) in HH at baseline	3.21	1.44	3.09	1.40	3.26	1.54	3.16	1.41
Dependency ratio	1.00	0.62	0.96	0.57	1.03	0.65	0.96	0.59
Wealth index	0.30	2.50	0.37	2.51	0.02	2.50	-0.08	2.38
HH has a cultivable pond (including rented/mortgaged/leased out ponds)	0.28	0.45	0.29	0.45	0.21	0.41	0.20	0.40
Total operated land of HH (acres)	1.08	1.09	1.15	1.24	1.09	1.19	0.96	0.80
Number of mobile phones owned	1.65	1.25	1.66	1.12	1.75	1.22	1.70	1.15
Ownership of television	0.36	0.48	0.34	0.48	0.33	0.47	0.32	0.47
Received extension visit for crop production	0.20	0.40	0.25	0.43	0.22	0.42	0.19	0.39
Received extension visit for livestock or fish production	0.06	0.25	0.06	0.24	0.04	0.20	0.02	0.15
Household has access to electricity	0.76	0.43	0.73	0.44	0.73	0.45	0.79	0.41
N	825		583		601		592	

Baseline characteristics of households (Restricted sample) - by Treatment arm

	Control		T-A		T-AN		T-ANG	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age of household head	38.17	11.65	37.44	11.38	39.84	13.51	37.67	11.58
Female-headed household	0.00	0.04	0.00	0.05	0.01	0.09	0.00	0.00

Average years of education of male (18+)	4.79	4.02	4.72	4.19	4.11	3.71	4.79	3.49
Average years of education of female (18+)	5.19	2.96	5.40	3.14	4.43	2.82	5.12	2.70
Number of adults (>=18 years) in HH at baseline	2.85	1.20	2.80	1.16	2.95	1.31	2.90	1.23
Dependency ratio	1.01	0.53	0.99	0.54	1.08	0.61	0.99	0.52
Wealth index	0.02	2.44	0.03	2.50	-0.34	2.52	-0.38	2.30
HH has a cultivable pond (including rented/mortgaged/leased out ponds)	0.27	0.44	0.28	0.45	0.21	0.41	0.21	0.40
Total operated land of HH (acres)	1.03	0.96	1.08	1.15	1.03	1.12	0.95	0.78
Number of mobile phones owned	1.39	1.01	1.48	1.00	1.52	1.09	1.51	0.94
Ownership of television	0.31	0.46	0.30	0.46	0.29	0.45	0.26	0.44
Received extension visit for crop production	0.19	0.40	0.23	0.42	0.20	0.40	0.20	0.40
Received extension visit for livestock or fish production	0.06	0.24	0.06	0.23	0.03	0.17	0.02	0.13
Household has access to electricity	0.75	0.43	0.71	0.46	0.71	0.46	0.76	0.43
N	541		384		394		384	

Source: Authors

Unless otherwise noted, we estimate ordinary-least-squares regressions for all outcome variables, including those where outcomes are dichotomous (i.e., linear probability models). Standard errors are clustered at the block level, which is the level at which the randomization was conducted (Abadie et al. 2023). For each outcome, we conduct Wald tests to assess whether the difference in impacts estimated from various treatment arms are statistically significant. Specifically, we assess whether T-A = T-AN; T-A = T-ANG; and T-AN = T-ANG. These comparisons allow us to infer how combined interventions compare with the single intervention (T-A); and how adding gender sensitization to the combined agriculture and nutrition intervention changes impacts.

2.5 Outcome Measures

Our measure of women's empowerment at endline is the pro-WEAI, an additive and decomposable index based on the Alkire-Foster methodology adapted from the WEAI (Alkire et al. 2013) for use in agricultural development

projects (Malapit et al. 2019).⁴ Pro-WEAI is based on a weighted adequacy count across 10 indicators. The 10 indicators seek to measure three types of agency: intrinsic; instrumental; and collective. The indicators of intrinsic agency comprise: autonomy in income, self-efficacy, and attitudes about IPV against women. Instrumental agency indicators are: 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. Finally, the collective agency domain includes one indicator: group membership. For each of these indicators, individuals are classified as adequate or inadequate based on pre-determined thresholds used in the pro-WEAI. The pro-WEAI is composed of the 3DE sub-index (three domains of empowerment, the pro-WEAI analogue of the five domains of empowerment (5DE) in the WEAI), which measures the extent and depth of empowerment, and the Gender Parity sub-index, which measures gender parity between women and men in the same household.

We use: (1) the individual empowerment score, defined as the weighted sum of the 10 pro-WEAI indicators; this score ranges from 0-1; and (2) the individual's empowerment status, which classifies an individual as empowered if his or her empowerment score is greater than or equal to 75% of the weighted sum of the 10 binary pro-WEAI indicators. In addition, we are also interested in gender parity. After calculating an empowerment score for the woman's partner, we assess whether the household has achieved *gender parity* if the woman is empowered, based on the above definition, or if she achieves at least the same empowerment score as her partner; thus, gender parity is a binary indicator at the household level. We set it equal to 0 if parity is attained, 1 if it is not attained. We also present impacts on the continuous version of the pro-WEAI component indicators (Table 3) to discern which aspects of empowerment contributed to the empowerment score; because these indicators are measured in different units, we estimate effect sizes for comparability.

Additionally, we examine impacts on workload and on the gender attitudes score, for both women and men. There is concern that increasing women's involvement in agricultural development projects could increase women's workload in both productive and reproductive work. However, messaging in the gender sensitization component of ANGeL could have encouraged men to help with household chores that were typically performed by women, leading to a reallocation of workloads. To assess this issue, at endline, we measure women's and men's workloads using the 24-hour recall module in pro-WEAI and assess impacts on the pro-WEAI continuous workload indicator, defined as total (productive) work hours plus half of time spent in childcare, if performed simultaneously with work.

Because one of the treatment arms (T-ANG) explicitly aimed to change attitudes towards gender and relationships through its gender sensitization programming, and because men's and women's attitudes could also have changed simply through participating in agricultural or nutrition training with their spouses, a module was added to the endline survey that aimed to capture men's and women's degree of agreement with statements related to attitudes. These statements were based on the content of the *Nurturing Connections* curriculum (HKI Bangladesh 2017) that were included in the gender sensitization arm. Respondents were asked about their extent of agreement with the statements using a five-point scale, where 1 is "strongly disagree" and 5 is "strongly agree." Statements were phrased so that they did not always reveal "positive" or more transformative gender attitudes; specifically, these were written so that agreement would be "better" for some statements while disagreement would be "better" for others. Using responses collected separately from women and men, we construct a gender attitudes composite score, which ranges from 9 to 45 and is the sum of the nine statements recoded so that a higher score is associated with more gender-equitable attitudes.

⁴ Note that this description draws heavily on Quisumbing et al (2021). The original version of pro-WEAI used 12 indicators. After subsequent validation and further testing, a revised version includes only 10 indicators (Seymour et al. 2023).

3. Results

We present our results for two estimation samples: (1) the sample of all women for whom we have observations on the empowerment variables in all rounds, based on the argument that we are most interested in the medium-term impact of this intervention on women; and (2) the sample of all women and men from the same household who were interviewed in both rounds; this sample is smaller than the first, but enables us to track the intrahousehold inequality score, a measure of gender inequality, over time.

Table 3. Definition of pro-WEAI indicators by type of agency measured

Pro-WEAI Measure	Binary indicator	Continuous indicator
<i>Pro-WEAI component indicators</i>		
<i>Intrinsic agency</i>		
Defined as adequate if:		
Autonomy in income	More motivated by own values than by coercion or fear of others' disapproval: Relative Autonomy Index score ≥ 1 . RAI score is calculated by summing responses to the three vignettes about a person's motivation for how they use income generated from agricultural and non-agricultural activities (yes = 1; no = 0), using the following weighting scheme: 0 for vignette 1 (no alternative), -2 for vignette 2 (external motivation), -1 for vignette 3 (introjected motivation), and +3 for vignette 4 (autonomous motivation)	RAI score (ranging from 3 to -3)
Self-efficacy	"Agree" or greater on average with self-efficacy questions: New General Self-Efficacy Scale score ≥ 32	Self-efficacy scale score (ranges from 8 to 40)
Attitudes about IPV against women	Believes husband is NOT justified in hitting or beating his wife in all 5 scenarios: 1) She goes out without telling him; 2) She neglects the children; 3) She argues with him; 4) She refuses to have sex with him; 5) She burns the food	Number of situations in which violence is not justified
Respect among household members	Meets ALL the following conditions related to their spouse, the other respondent, or another household member: 1) Respondent respects relation (MOST of the time) AND 2) Relation respects respondent (MOST of the time) AND 3) Respondent trusts relation (MOST of the time) AND 4) Respondent is comfortable disagreeing with relation (MOST of the time)	Number of conditions met from the following: 1) Respondent respects relation (MOST of the time); 2) Relation respects respondent (MOST of the time); 3) Respondent trusts relation (MOST of the time); 4) Respondent is comfortable disagreeing with relation (MOST of the time)
<i>Instrumental agency</i>		
Defined as adequate if:		
Input in productive decisions	Meets at least ONE of the following conditions for ALL the agricultural activities they participate in: 1) makes related decision solely; 2) makes	Number of types of agricultural and non-agricultural activities for which the respondent makes decision

Pro-WEAI Measure	Binary indicator	Continuous indicator
	the decision jointly and has at least some input into the decisions; 3) feels could make decision if wanted to (to at least a MEDIUM extent)	solely, makes decision jointly and has at least some input in the decisions, or feels could make decision
Ownership of land and other assets	Owns, either solely or jointly, at least ONE of the following: 1) At least THREE small assets (poultry, nonmechanized equipment, or small consumer durables); 2) At least TWO large assets; 3) Land	Number of asset types (including agricultural land) solely or jointly owned
Access to and decisions on financial services	Meets at least ONE of the following conditions: 1) Belongs to a household that used a source of credit in the past year AND participated in at least ONE sole or joint decision about it; 2) Belongs to a household that did not use credit in the past year but could have if wanted to from at least ONE source; 3) Has access, solely or jointly, to a financial account	Number of types of credit sources in which respondent participates in at least one sole or joint decision, plus access to sole or joint financial account
Control over use of income	Has input in decisions related to how to use BOTH income and output from ALL the agricultural activities they participate in AND has input in decisions related to income from ALL non-agricultural activities they participate in, unless no decision was made	Number of types of activities in which respondent has some control over use of income
Work balance	Works less than 10.5 hours per day: Workload = time spent in primary activity + (1/2) time spent in childcare as a secondary activity	Time spent on paid and unpaid work, plus .5 x time spent on childcare as a secondary activity
Visiting important locations	Meets at least ONE of the following conditions: Visits at least TWO locations at least ONCE PER WEEK of [city, market, family/relative], or 2) Visits least ONE location at least ONCE PER MONTH of [health facility, public meeting]	Number of types of important locations visited
Collective agency		
Group membership	Active member of at least ONE group	Number of types of groups of which the respondent is an active member
Membership in influential groups	Active member of at least ONE group that can influence the community to at least a MEDIUM extent	Number of types of groups of which the respondent is an active member and which the respondent regards as influential
Aggregate measures		

Pro-WEAI Measure	Binary indicator	Continuous indicator
Five Domains of Empowerment Index (5DE) (A-WEAI) or Three Domains of Empowerment Index (3DE)	Whether empowered: if individual achieves at least an empowerment score of 80% (A-WEAI) or 75% (pro-WEAI)	Empowerment score
Gender Parity Index (GPI)	Whether household achieves gender parity: woman's empowerment score is greater than or equal to the empowerment score of the male decision maker in her household.	Intrahousehold inequality score (men's empowerment score minus women's empowerment score)

Source: Binary indicators: Malapit et al. (2019); continuous indicators: Authors.

Notes: There is a slight discrepancy in the definitions for the binary and continuous indicator for "input in productive decisions." Projects calculated the original version of the binary indicator, which only included agricultural activities, whereas the continuous indicator was based on a revised version of the indicator, which includes both agricultural and non-agricultural activities. See Seymour et al. (forthcoming) for more detail.

3.1 Impacts on Composite Indicators of Women's Empowerment (Full Sample)

Table 3 shows that at endline, all treatment arms increased women's empowerment (as measured by the pro-WEAI individual empowerment score) by between 5 to 6 percentage points and increased the likelihood that women were empowered by 9-11 percentage points. These effects attenuate by 2022, but the extent of attenuation is uneven. Exposure to any treatment increases the individual empowerment score by 3 pp. The T-ANG treatment arm continues to increase women's empowerment, by 5 percentage points while the other two treatment arms have smaller effects (3 and 2 percentage points respectively for T-A and T-AN). Similarly, impacts on the likelihood of being empowered are smaller in 2022. The impact of being exposed to any treatment, while positive and significant, is smaller (4 pp) than the impact at end line (9 pp), and the coefficient estimates in 2022 are about half of those estimated in 2018. Although impacts in the T-A and T-ANG treatment arms are statistically significant, the impact of the T-AN treatment is no longer significant. Impacts on the intrahousehold inequality score are calculated for the smaller sample of households for which men answered the pro-WEAI questionnaire. Impacts on intrahousehold inequality are about the same for 2018 and 2022, except for the T-AN treatment, where the impact is statistically indistinguishable from zero.

Tests of equality of coefficients across treatment arms reveal that impacts of treatments with agriculture and nutrition on women's composite indicators were significantly different from the agriculture treatment in 2022, but only with $p < 0.10$, while a comparison between T-AN and T-ANG reveals significant differences between the two treatments. Similar tests for 2018 do not reject the null that the gender sensitization arm has differential impacts on women's composite indicators compared to the agriculture arm and the agriculture plus nutrition arm. For the intrahousehold inequality score, we reject the null hypothesis that T-AN and T-ANG have similar impacts.

Table 4. Treatment impacts on composite WEAI indicators at endline and post-program - Women

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Empowerment Score										
2018	0.58	0.05*** (0.01)	0.05*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.18	0.19	0.89	2,158	0.17
2022	0.56	0.03*** (0.01)	0.03** (0.01)	0.02* (0.01)	0.05*** (0.01)	0.67	0.09	0.02	2,158	0.12
Whether empowered										
2018	0.15	0.09*** (0.02)	0.08*** (0.03)	0.11*** (0.03)	0.11*** (0.03)	0.30	0.28	0.95	2,158	0.14
2022	0.09	0.04*** (0.01)	0.04** (0.02)	0.02 (0.02)	0.06*** (0.02)	0.36	0.53	0.12	2,158	0.07
Intra-household inequality score										
2018	0.08	-0.03*** (0.01)	-0.03** (0.01)	-0.04** (0.01)	-0.04** (0.01)	0.62	0.62	0.99	1,820	0.13
2022	0.12	-0.03** (0.01)	-0.03*** (0.01)	-0.01 (0.02)	-0.04*** (0.02)	0.11	0.51	0.04	1,820	0.15

3.2 Impacts on Component Indicators of Women's Empowerment (Full Sample)

To unpack the sources of persistence (or attenuation) of empowerment impacts, we examine impacts on the component pro-WEAI indicators (Table 4). Improvements in some intrinsic indicators that were observed in 2018 do not appear to persist in 2022, yet other indicators improved. No impacts were observed in autonomy in the use of income in either 2018 or 2022. Impacts on self-efficacy, which were significant in 2018, weakened in 2022, except for a weakly significant coefficient in the agriculture treatment arm. Interestingly, impacts on attitudes toward intimate partner violence, measured by the number of instances in which IPV was deemed unacceptable, which were only weakly significant and positive in the gender sensitization arm in 2018, were positive and significant in 2022, with a 40 pp increase relative to the control arm. Exposure to any treatment increases the number of situations reported by respondents where IPV is unjustified by 18 pp. This indicates not only a persistence of impact but a strengthening of critical consciousness about the unacceptability of IPV.

Impacts on instrumental agency indicators at follow-up are attenuated, despite positive and significant impacts in 2018. The number of livelihood decisions made, the number of credit sources, the number of income sources that women controlled, and the number of locations visited increased in most treatments at endline relative to the control arm. However, in 2022, only the impact on the number of assets over which women made decisions remained significant in the T-ANG arm, and we fail to reject the null impact of any treatment only on the number of income sources controlled. There were no impacts detected on the number of hours worked.

Finally, although significant and positive impacts were detected on the number of groups to which women belonged at endline, effects were weaker at follow-up: we weakly fail to reject the null that any treatment had an effect ($p < 0.10$).

Table 5. Treatment impacts on empowerment indicators at endline and post-program - Women

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Autonomy in income (RAI score, ranges from 3 to -3)										
2018	1.82	-0.03 (0.10)	-0.04 (0.11)	-0.09 (0.13)	0.07 (0.11)	0.64	0.30	0.17	2,162	0.11
2022	0.92	0.00 (0.11)	0.05 (0.13)	0.01 (0.12)	-0.10 (0.15)	0.76	0.29	0.43	2,162	0.15
Self-efficacy (self-efficacy scale score, ranges from 8-40)										
2018	15.33	0.36** (0.15)	0.27 (0.17)	0.47** (0.20)	0.36** (0.18)	0.29	0.65	0.59	2,162	0.16
2022	16.08	0.21 (0.22)	0.45* (0.26)	0.16 (0.25)	-0.11 (0.25)	0.22	0.04	0.22	2,162	0.14
Attitudes about IPV (number of situations in which violence not justified)										
2018	4.12	0.11	0.06	0.11	0.17*	0.59	0.25	0.53	2,162	0.13

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
		(0.08)	(0.09)	(0.08)	(0.10)					
2022	3.87	0.18**	0.06	0.17	0.41***	0.32	0.00	0.02	2,162	0.18
		(0.09)	(0.10)	(0.11)	(0.10)					
Input in livelihood decisions (number of decisions)										
2018	3.83	0.18**	0.10	0.19**	0.31***	0.32	0.04	0.24	2,162	0.20
		(0.08)	(0.09)	(0.09)	(0.11)					
2022	2.73	0.11	0.15	0.07	0.10	0.49	0.70	0.83	2,162	0.19
		(0.09)	(0.12)	(0.10)	(0.13)					
Ownership of land and other assets (number of asset types solely or jointly owned)										
2018	4.89	0.06	-0.03	0.03	0.26**	0.68	0.02	0.13	2,162	0.21
		(0.10)	(0.11)	(0.15)	(0.13)					
2022	4.81	0.13	0.16	-0.05	0.30*	0.32	0.49	0.07	2,162	0.07
		(0.14)	(0.18)	(0.18)	(0.18)					
Access to and decisions on credit (number of credit sources)										

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
2018	0.91	0.59*** (0.04)	0.62*** (0.05)	0.57*** (0.06)	0.58*** (0.06)	0.48	0.57	0.91	2,162	0.17
2022	1.37	0.03 (0.06)	-0.01 (0.08)	0.03 (0.08)	0.09 (0.10)	0.65	0.35	0.60	2,162	0.07
Control over use of income (number of income earning activities)										
2018	3.46	0.27*** (0.09)	0.20* (0.11)	0.28*** (0.10)	0.38*** (0.12)	0.37	0.10	0.34	2,162	0.19
2022	2.49	0.19** (0.09)	0.23* (0.12)	0.12 (0.11)	0.20 (0.13)	0.38	0.84	0.58	2,162	0.19
Visiting important locations (number of important locations visited)										
2018	0.36	0.10*** (0.03)	0.06 (0.04)	0.13*** (0.04)	0.13*** (0.04)	0.10	0.07	0.99	2,162	0.11
2022	0.44	0.05 (0.05)	0.01 (0.06)	0.08 (0.06)	0.09 (0.06)	0.24	0.17	0.92	2,162	0.11
Group membership (Number of types)										

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
of groups of which the respondent is an active member)										
2018	0.54	0.05 (0.03)	-0.02 (0.05)	0.09** (0.04)	0.10** (0.04)	0.03	0.03	0.77	2,162	0.12
2022	0.29	0.06* (0.03)	0.06 (0.04)	0.06 (0.04)	0.06 (0.05)	0.98	0.88	0.85	2,162	0.09
Workload (Time spent on paid and unpaid work, plus 0.5 x time spent on childcare) as a secondary activity)										
2018	31.64	0.05 (0.13)	-0.06 (0.16)	0.09 (0.16)	0.19 (0.18)	0.37	0.20	0.56	2,162	0.11
2022	31.73	-0.06 (0.16)	-0.07 (0.21)	-0.14 (0.16)	0.06 (0.22)	0.71	0.57	0.30	2,162	0.10

3.3 Impacts on Composite Indicators, Restricted Sample

To analyze changes in gender norms and gender dynamics, it is important to examine impacts on men. To do so, we restrict our sample to those households where the same man and woman were interviewed in all rounds. This sample restriction means that our included households (and individuals) may not be typical; for one, they are those whose marriages have remained intact and where neither spouse migrated. We present this preliminary analysis without controlling for attrition.

Table 5, panel A presents treatment impacts on composite indicators at endline and follow-up for this restricted sample of women. The results are almost identical to that of the full sample: impacts on the empowerment score in all treatments are positive and significant, although attenuated relative to those at endline by 2-4 pp, except for the gender sensitization arm, where the estimated impact at follow-up is only 1 pp less than at endline. Impacts on empowerment status were positive and significant at endline across all treatments, but attenuated at endline, with the impact in the agriculture and nutrition arm becoming insignificant. At endline, the probability of a woman being empowered from any treatment was 10 pp higher than in the control arm, but by 2022, this probability had dropped to 4 pp (a 6 pp decrease). We also observe a decrease in the impact at follow-up in the gender sensitization arm, but only 3 pp relative to endline. Nevertheless, we reject the null hypothesis that the impacts across treatment arms differed.

Table 5, panel B shows corresponding estimates for men. Positive and significant impacts on men's empowerment scores were detected in the agriculture-nutrition and the agriculture-nutrition-gender arms at endline, but these impacts were insignificant at follow-up, and exposure to treatment, regardless of treatment arm, had a null impact on men's empowerment scores in 2022. Significant impacts on men's empowerment status at endline were confined to the gender sensitization arm ($p < 0.01$) although exposure to any treatment had a weak ($P < 0.10$) positive impact on the probability that a man was empowered. Tests of equality of coefficients across arms reject the null hypothesis that impacts in the agriculture-nutrition-gender arm differed from those in the agriculture arm alone and the agriculture-nutrition arm, albeit only at $p < 0.10$. At follow-up, however, positive impacts on men's empowerment status were detected in all arms except for the agriculture-only arm. Although impacts in the gender sensitization arm were smaller by 3 pp, impacts in the agriculture-nutrition arm were positive and significant, and the impact of any treatment was 2 pp higher than the impact at endline.

Finally, panel C presents impacts on the intrahousehold inequality score at endline and follow-up. All treatments significantly reduced intrahousehold inequality at endline by 3-4 pp. These results persist at endline, with no attenuation.

Table 6. Treatment impacts on composite WEAI indicators at endline and post-program (Restricted Sample)

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Panel A: Women										
Empowerment Score										
2018	0.59	0.05*** (0.01)	0.04*** (0.01)	0.06*** (0.01)	0.06*** (0.01)	0.24	0.21	0.81	1,702	0.16
2022	0.56	0.03*** (0.01)	0.02* (0.01)	0.02* (0.01)	0.05*** (0.01)	0.77	0.04	0.08	1,702	0.11
Whether empowered										
2018	0.15	0.10*** (0.02)	0.09*** (0.03)	0.10*** (0.03)	0.10*** (0.03)	0.58	0.54	0.96	1,702	0.14
2022	0.09	0.04*** (0.02)	0.04* (0.02)	0.02 (0.02)	0.07*** (0.03)	0.59	0.31	0.15	1,702	0.07
Panel B: Men										
Empowerment Score										
2018	0.67	0.02** (0.01)	0.01 (0.01)	0.02* (0.01)	0.03*** (0.01)	0.71	0.14	0.24	1,651	0.13
2022	0.67	0.00 (0.01)	-0.01 (0.01)	0.02 (0.01)	0.01 (0.01)	0.01	0.06	0.49	1,651	0.16
Whether empowered										

2018	0.26	0.04*	0.03	0.03	0.09***	0.93	0.09	0.07	1,651	0.12
		(0.02)	(0.03)	(0.03)	(0.03)					
2022	0.23	0.06***	0.03	0.11***	0.06*	0.08	0.56	0.23	1,651	0.10
		(0.02)	(0.03)	(0.03)	(0.03)					
Panel C: Intra-household inequality score										
2018	0.08	-0.03***	-0.03**	-0.04***	-0.03**	0.50	0.80	0.70	1,650	0.12
		(0.01)	(0.01)	(0.01)	(0.01)					
2022	0.11	-0.03**	-0.03**	-0.01	-0.04**	0.23	0.43	0.06	1,650	0.14
		(0.01)	(0.01)	(0.02)	(0.02)					

Notes. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$. All specifications include as independent variables the treatment indicators and the following baseline control variables: age and sex of household head, mean education levels of males and females 18 and older, number of adults, dependency ratio, wealth index, land owned, fishpond owned, access to information as measured by (baseline) number of mobile phones owned, ownership of television, received extension visit for crop production, received extension visit for livestock or fish production, household has access to electricity, and baseline upazila.

3.4 Impacts on Component Indicators, Restricted Sample

Analyzing impacts on the component indicators enables us to identify which factors contributed to the sustained impact—or lack thereof—in empowerment.

Table 7 presents treatment impacts on women’s component indicators at endline and follow-up. At endline (2018), positive impacts were reported on several indicators for women: self-efficacy (agriculture, agriculture and nutrition, agriculture, nutrition, and gender); input in livelihood decisions (T-ANG only), access to and decisions on credit (T-A, T-AN, T-ANG), control over the use of income (any treatment, T-AN, T-ANG), visiting important locations (T-A, T-AN, T-ANG), and group membership (any treatment, T-AN, T-ANG). Four years later, these impacts have largely disappeared or for those that remain significant, been attenuated. Impacts on the number of credit sources are detected only in the T-ANG treatment arm, and we fail to reject the null that exposure to treatment has no impact.

Table 8 shows the corresponding impacts for men at endline and follow-up. Similar to the women’s results, positive impacts were reported at endline for several indicators: attitudes towards domestic violence, input in livelihood decision, access to and decisions on credit, and control over the use of income. However, at endline, these results dissipated. The only exception was self-efficacy, in which negative impacts were observed at follow-up, and group membership, where a positive impact was observed only in the agriculture-nutrition treatment arm.

We propose four explanations, none of which are mutually exclusive. First, it is possible that, without additional training or inputs from the project after it ended in 2018, impacts would either not be sustained or be attenuated. This is perhaps the default explanation for the absence of or attenuation of impact across multiple indicators. Second, measures undertaken in 2020 to limit the spread of COVID-19 may have prevented impacts from being sustained. This may underlie the absence of significant impacts on group membership; the number of groups to which women belonged in the control arm declined from 0.57 to 0.30, and it would not be surprising if group membership declined in the treatment arm as well. Results using the Abbreviated WEAI (A-WEAI) from the nationally-representative Bangladesh Integrated Household Survey revealed an increase in the proportion disempowered between the baseline (2018/2019) and the midline (2022) surveys, owing to disempowerment with respect to group membership (Feed the Future 2023). Third, the control group may have experienced improvements in some indicators, so differences from the control group may no longer be significant. This may be the case for access to and decisions on credit; the number of credit sources that women and men in the control group had access to and decisionmaking power over increased from 0.94 to 1.33 for women and 1.31 to 1.83 for men, respectively. Finally, the positive impact on attitudes toward IPV suggests that it takes time for normative change to take place, but also possible negative effects on men to manifest, as shown by negative impacts on self-efficacy at follow-up.

Table 7. Treatment impacts on empowerment indicators at endline and post-program (Restricted sample) - Women

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Autonomy in income										
2018	1.79	-0.03 (0.11)	-0.05 (0.13)	-0.08 (0.13)	0.07 (0.13)	0.81	0.36	0.27	1,703	0.10
2022	0.92	-0.05 (0.12)	-0.08 (0.13)	0.06 (0.13)	-0.15 (0.16)	0.26	0.62	0.17	1,703	0.16
Self-efficacy										
2018	15.13	0.48*** (0.16)	0.36* (0.19)	0.62*** (0.22)	0.51** (0.20)	0.19	0.44	0.61	1,703	0.17
2022	16.15	0.18 (0.22)	0.26 (0.26)	0.26 (0.25)	-0.04 (0.25)	1.00	0.24	0.16	1,703	0.13
Attitudes about domestic violence										
2018	4.08	0.07 (0.09)	0.03 (0.10)	0.04 (0.10)	0.18 (0.12)	0.91	0.16	0.24	1,703	0.14
2022	3.84	0.20* (0.10)	0.08 (0.11)	0.17 (0.13)	0.44*** (0.12)	0.47	0.00	0.02	1,703	0.19
Input in livelihood decisions										

2018	3.96	0.14 (0.09)	0.05 (0.10)	0.11 (0.10)	0.30** (0.12)	0.51	0.03	0.09	1,703	0.20
2022	2.90	0.03 (0.10)	0.08 (0.12)	-0.01 (0.11)	0.01 (0.14)	0.43	0.62	0.88	1,703	0.19
Ownership of land and other assets										
2018	5.00	0.03 (0.11)	-0.09 (0.12)	0.08 (0.17)	0.17 (0.13)	0.30	0.04	0.61	1,703	0.21
2022	4.85	0.09 (0.16)	0.13 (0.20)	-0.07 (0.20)	0.22 (0.21)	0.37	0.66	0.16	1,703	0.07
Access to and decisions on credit										
2018	0.94	0.61*** (0.05)	0.64*** (0.05)	0.60*** (0.07)	0.57*** (0.07)	0.60	0.32	0.70	1,703	0.17
2022	1.33	0.09 (0.06)	0.01 (0.08)	0.10 (0.08)	0.20* (0.11)	0.32	0.10	0.45	1,703	0.08
Control over use of income										
2018	3.64	0.22** (0.10)	0.16 (0.12)	0.21* (0.11)	0.33** (0.14)	0.62	0.16	0.29	1,703	0.19
2022	2.65	0.13	0.17	0.06	0.15	0.35	0.85	0.56	1,703	0.19

		(0.10)	(0.12)	(0.12)	(0.14)					
Visiting important locations										
2018	0.36	0.11*** (0.04)	0.08* (0.05)	0.14*** (0.04)	0.13*** (0.04)	0.21	0.24	0.81	1,703	0.11
2022	0.40	0.07 (0.05)	0.04 (0.06)	0.08 (0.06)	0.09 (0.06)	0.62	0.43	0.78	1,703	0.13
Group membership										
2018	0.57	0.06* (0.04)	-0.01 (0.05)	0.11*** (0.04)	0.12** (0.05)	0.04	0.04	0.89	1,703	0.12
2022	0.30	0.05 (0.04)	0.05 (0.05)	0.04 (0.04)	0.06 (0.06)	0.99	0.74	0.70	1,703	0.09
Work balance										
2018	31.68	0.12 (0.15)	-0.02 (0.18)	0.18 (0.18)	0.26 (0.18)	0.29	0.17	0.65	1,703	0.12
2022	31.91	-0.13 (0.18)	-0.10 (0.24)	-0.22 (0.18)	-0.07 (0.25)	0.59	0.90	0.52	1,703	0.09

Table 8. Treatment impacts on empowerment indicators at endline and post-program (Restricted sample) - Men

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
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Autonomy in income

2018	2.59	0.00 (0.05)	0.01 (0.05)	-0.05 (0.08)	0.06 (0.07)	0.57	0.42	0.27	1,703	0.14
2022	1.59	0.05 (0.10)	-0.08 (0.12)	0.12 (0.13)	0.19 (0.14)	0.15	0.05	0.61	1,703	0.12

Self-efficacy

2018	16.05	0.05 (0.16)	-0.08 (0.19)	-0.01 (0.18)	0.32 (0.20)	0.73	0.04	0.03	1,703	0.11
2022	16.47	-0.38** (0.14)	-0.38** (0.17)	-0.36* (0.20)	-0.40** (0.20)	0.94	0.91	0.86	1,703	0.12

Attitudes about domestic violence

2018	4.32	0.10* (0.06)	0.04 (0.08)	0.13* (0.07)	0.17* (0.10)	0.35	0.29	0.71	1,703	0.10
2022	4.44	0.05 (0.06)	0.07 (0.07)	0.06 (0.06)	-0.00 (0.07)	0.83	0.33	0.38	1,703	0.13

Input in livelihood decisions

2018	4.21	0.23*** (0.07)	0.26*** (0.09)	0.14 (0.09)	0.31*** (0.09)	0.22	0.64	0.12	1,703	0.24
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2022	2.38	0.08 (0.09)	0.08 (0.10)	0.08 (0.11)	0.09 (0.12)	0.98	0.90	0.92	1,703	0.11
Ownership of land and other assets										
2018	7.82	0.02 (0.08)	-0.03 (0.10)	0.01 (0.13)	0.12 (0.12)	0.78	0.25	0.46	1,703	0.27
2022	6.46	0.05 (0.15)	-0.13 (0.22)	0.04 (0.19)	0.34 (0.24)	0.51	0.11	0.23	1,703	0.27
Access to and decisions on credit										
2018	1.31	0.33*** (0.06)	0.38*** (0.08)	0.31*** (0.08)	0.28*** (0.08)	0.44	0.21	0.69	1,703	0.21
2022	1.83	-0.02 (0.09)	-0.04 (0.11)	-0.05 (0.12)	0.04 (0.13)	0.90	0.57	0.55	1,703	0.13
Control over use of income										
2018	4.14	0.24*** (0.07)	0.23*** (0.08)	0.15* (0.09)	0.35*** (0.10)	0.40	0.25	0.07	1,703	0.23
2022	2.34	0.08 (0.09)	0.07 (0.10)	0.11 (0.11)	0.06 (0.12)	0.72	0.94	0.68	1,703	0.12
Visiting important locations										

2018	1.57	0.05 (0.05)	0.06 (0.07)	0.02 (0.06)	0.08 (0.06)	0.54	0.79	0.32	1,703	0.14
2022	1.59	0.00 (0.05)	-0.01 (0.07)	0.07 (0.07)	-0.06 (0.07)	0.32	0.49	0.10	1,703	0.09
Group membership										
2018	0.36	-0.00 (0.04)	-0.00 (0.05)	-0.03 (0.05)	0.03 (0.05)	0.68	0.58	0.37	1,703	0.12
2022	0.35	0.02 (0.03)	-0.06 (0.04)	0.09** (0.04)	0.05 (0.05)	0.00	0.03	0.44	1,703	0.11
Work balance										
2018	33.38	0.26 (0.20)	0.13 (0.24)	0.37 (0.25)	0.32 (0.27)	0.35	0.51	0.84	1,703	0.09
2022	32.72	-0.12 (0.24)	0.06 (0.23)	-0.16 (0.31)	-0.36 (0.31)	0.40	0.11	0.52	1,703	0.06

Notes. * p < 0.10; ** p < 0.05; *** p < 0.01. All specifications include as independent variables the treatment indicators and the following baseline control variables: age and sex of household head, mean education levels of males and females 18 and older, number of adults, dependency ratio, wealth index, land owned, fishpond owned, access to information as measured by (baseline) number of mobile phones owned, ownership of television, received extension visit for crop production, received extension visit for livestock or fish production, household has access to electricity, and baseline upazila.

3.5 Impacts on Workload

Whether empowerment interventions increase workload is a valid concern. However, the intervention does not seem to have increased workload (defined as the sum of productive and ½ of time spent of childcare of performed simultaneously) for women in general (Table 9). Although the gender sensitization treatment appears to have increased women’s work hours in the restricted sample, this dissipates by 2022, and workload even decreases in the T-AN treatment in 2022. No discernable impacts are detected on men’s workload in both 2018 and 2022.

3.6 Impacts on Gender Attitudes

Did ANGeL end up being a gender-transformative intervention? Endline results (2018) were indicative of changes in attitudes in gender norms, as evidenced by significant impacts on the gender attitudes score of women and men in the restricted sample from exposure to any treatment, but which were largely accounted for by the treatments that involved nutrition, with or without gender sensitization (Table 10). Indeed, impacts of these treatments were significantly different from the agriculture arm in 2018 for women, but only for the agriculture-nutrition arm for men. At endline, however, there is no evidence of any impact on the gender attitudes score in any treatment for either women or men.

Table 9. Treatment impacts on workload at endline and post-program (Restricted sample)

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Panel A: Women										
Time spent working (hours)										
2018	9.56	0.13 (0.13)	-0.02 (0.16)	0.14 (0.17)	0.38** (0.16)	0.35	0.02	0.15	1,703	0.15
2022	8.56	-0.19 (0.16)	-0.13 (0.22)	-0.27 (0.17)	-0.18 (0.21)	0.51	0.86	0.64	1,703	0.10
Hours spent on productive work										
2018	1.62	0.11 (0.09)	0.02 (0.11)	0.16 (0.13)	0.21 (0.13)	0.31	0.15	0.76	1,703	0.12
2022	1.99	-0.15 (0.13)	-0.17 (0.17)	-0.26* (0.13)	0.00 (0.14)	0.57	0.28	0.05	1,703	0.12
Hours spent on domestic/care work										
2018	7.93	0.02 (0.12)	-0.04 (0.14)	-0.02 (0.17)	0.17 (0.15)	0.90	0.18	0.21	1,703	0.16
2022	6.57	-0.04 (0.14)	0.04 (0.17)	-0.02 (0.15)	-0.18 (0.20)	0.71	0.24	0.36	1,703	0.14
Panel B: Men										
Time spent working										

(hours)										
2018	9.63	0.31	0.20	0.38	0.39	0.48	0.49	0.95	1,703	0.08
		(0.20)	(0.23)	(0.25)	(0.27)					
2022	8.87	-0.14	0.05	-0.18	-0.40	0.37	0.09	0.47	1,703	0.06
		(0.23)	(0.22)	(0.30)	(0.31)					
Hours spent on productive work										
2018	8.75	0.26	0.17	0.36	0.28	0.51	0.72	0.78	1,703	0.06
		(0.23)	(0.27)	(0.29)	(0.30)					
2022	8.04	-0.13	0.01	-0.12	-0.35	0.66	0.22	0.44	1,703	0.07
		(0.24)	(0.25)	(0.32)	(0.32)					
Hours spent on domestic/care work										
2018	0.88	0.05	0.04	0.02	0.12	0.90	0.51	0.49	1,703	0.08
		(0.08)	(0.10)	(0.11)	(0.12)					
2022	0.84	-0.01	0.05	-0.06	-0.05	0.41	0.40	0.93	1,703	0.09
		(0.09)	(0.12)	(0.12)	(0.10)					

Notes. * p < 0.10; ** p < 0.05; *** p < 0.01. All specifications include as independent variables the treatment indicators and the following baseline control variables: age and sex of household head, mean education levels of males and females 18 and older, number of adults, dependency ratio, wealth index, land owned, fishpond owned, access to information as measured by (baseline) number of mobile phones owned, ownership of television, received extension visit for crop production, received extension visit for livestock or fish production, household has access to electricity, and baseline upazila.

Table 10. Treatment impacts on gender attitudes at endline and post-program (Restricted sample)

	Control mean	Pooled T	T-A	T-AN	T-ANG	T-A = T-AN	T-A = T-ANG	T-AN = T-ANG	N	R-squared
Women's gender attitudes score (9-45)										
2018	34.46	0.52** (0.23)	0.15 (0.28)	0.82** (0.32)	0.77** (0.30)	0.05	0.05	0.89	1,702	0.13
2022	35.11	0.32 (0.29)	0.28 (0.45)	0.23 (0.32)	0.50 (0.35)	0.90	0.66	0.47	1,702	0.15
Men's gender attitudes score (9-45)										
2018	34.40	0.63*** (0.22)	0.39 (0.30)	0.69*** (0.26)	0.94*** (0.25)	0.36	0.08	0.30	1,702	0.09
2022	34.23	0.14 (0.27)	0.24 (0.32)	0.20 (0.35)	-0.09 (0.32)	0.89	0.33	0.36	1,702	0.25

Notes. * p < 0.10; ** p < 0.05; *** p < 0.01. All specifications include as independent variables the treatment indicators and the following baseline control variables: age and sex of household head, mean education levels of males and females 18 and older, number of adults, dependency ratio, wealth index, land owned, fishpond owned, access to information as measured by (baseline) number of mobile phones owned, ownership of television, received extension visit for crop production, received extension visit for livestock or fish production, household has access to electricity, and baseline upazila.

4. Concluding Remarks

Whether interventions have sustainable impacts after they end is a question of considerable policy and programmatic importance. The nascent literature on this topic, summarized briefly in the introduction, shows mixed findings. Further, much of the work in this area focuses on sustained (or not) impacts on consumption, assets, and poverty. We advance knowledge by assessing whether an intervention designed to convey knowledge about agricultural and nutrition through an approach that explicitly aimed to break down traditional gendered “siloes of activities” (men look after food production, women look after cooking) had sustained impacts on aspects of women’s empowerment. Further, we assess whether the form of the training (agriculture, nutrition, gender sensitization) affected the likelihood or magnitude of the persistence of impacts.

Our core finding is that ANGeL had sustained impacts four years after it ended, increasing the likelihood that women were empowered by four percentage points and reducing intra-household inequality by three percentage points. The magnitudes of these impacts are comparable across treatment arms.

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