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The Women's Empowerment in Agriculture Index Results from SPRING/Bangladesh's Farmer Nutrition Schools

A Quantitative Study

April 2017

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ABOUT SPRING

The Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) project is a six-year USAID-funded cooperative to strengthen global and country efforts to scale up high-impact nutrition practices and policies and improve maternal and child nutrition outcomes. The project is managed by JSI Research & Training Institute, Inc., with partners Helen Keller International, The Manoff Group, Save the Children, and the International Food Policy Research Institute.

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Acronyms and Abbreviations

5DE	Five Domains of Empowerment
A-WEAI	Abbreviated Women's Empowerment in Agriculture Index
BDHS	Bangladesh Demographic Health Survey
BIHS	Bangladesh Integrated Household Survey
EHA	Essential Hygiene Actions
ENA	Essential Nutrition Actions
FGD	focus group discussion
FNS	Farmer Nutrition School
FTF	Feed the Future
FY	fiscal year
GPI	Gender Parity Index
HFP	homestead food production
HH	household
HKI	Helen Keller International
JSI	JSI Research and Training Institute, Inc.
IFPRI	International Food Policy Research Institute
IYCF	infant and young child feeding
OPHI	Oxford Poverty & Human Development Initiative
PLW	pregnant and lactating women
PRSSP	Policy Research and Strategy Support Program for Food Security and Agricultural Development
PSU	primary sampling unit
SPRING	Strengthening Partnerships, Results and Innovations in Nutrition Globally
USAID	United States Agency for International Development
WEAI	Women's Empowerment in Agriculture Index
ZOI	zone of influence

Introduction

SPRING/Bangladesh, working in Bangladesh since 2012, has been using a multichannel integrated approach to tackling malnutrition along the nation's coastal belt using both nutrition-specific and nutrition-sensitive interventions. With the Essential Nutrition Actions and Essential Hygiene Actions (ENA/EHA) as the technical foundation of its work, SPRING/Bangladesh has developed a variety of interventions, grounded in existing evidence-based approaches, to tackle malnutrition, with a particular focus on the first 1,000 days. SPRING targets pregnant and lactating women and their children as the primary audience, while also working with husbands and other family and community members. After several years of implementation, SPRING field staff noticed that women who had participated in SPRING's program—particularly those who had participated in its Farmer Nutrition School (FNS) activity—seemed more confident, more in control of their family's health and diet, and better linked to the government extension system. Thus, SPRING posed the research question: Are SPRING FNS participants more empowered than those women and families who have not participated in the program?

The Bangladesh Policy Research and Strategy Support Program (PRSSP) for Food Security and Agricultural Development, funded by USAID and implemented by IFPRI, was launched in October 2010. PRSSP conducts applied research to fill knowledge gaps on critical food security and agricultural development issues in Bangladesh. Its main objectives are to provide policy options and advisory services to decision makers and stakeholders, to collaborate with national institutions to strengthen analytical capacity within the country, and to stimulate policy dialogue.

The Bangladesh Integrated Household Survey (BIHS), designed by IFPRI researchers, is the most comprehensive, nationally representative survey of households (HHs) conducted to date. The carefully collected data serve as a baseline for the U.S. Government's Feed the Future (FTF) zone of influence (ZOI) in southern Bangladesh. Future progress of the FTF initiative can be measured against survey results as a point of reference. In addition, varied studies can use the survey's integrated data platform to carry out research with policy implications for the country's food security and agricultural development.

Because all the direct participants of SPRING's FNS program are women and have gone through a series of capacity building interventions on infant and young child feeding (IYCF), including home-based food production (i.e., home gardening, poultry rearing, and aquaculture), it was expected that they would be more empowered than women not exposed to the intervention and women who received different interventions provided by other projects.

Survey Instrument

The Women's Empowerment in Agriculture Index (WEAI) is a survey-based aggregate index designed to measure women's empowerment, agency, and inclusion in the agriculture sector. IFPRI developed the WEAI in 2012 as a tool to reflect changes in women's empowerment that might result from the U.S. Government's FTF initiative, which commissioned the WEAI's development. Since 2012, the WEAI has also been used by a variety of organizations to assess empowerment and gender parity in agriculture, to identify key areas in which empowerment needs to be strengthened, and to track progress over time. Based on the Alkire-Foster methodology for the multidimensional poverty index (2011), the WEAI is reported at country or regional level and based on individual-level data collected by interviewing men and women within the same households. The WEAI comprises two sub-indexes. The first assesses the degree to which women are empowered within five domains of empowerment (5DE) in agriculture. The second measures gender parity within surveyed households. The Gender Parity Index (GPI) reflects the percentage of women whose empowerment is equal to that of the men in their households.

Table 1. The Five Domains of Empowerment in the Women's Empowerment in Agriculture Index

Domain	Indicators
Production decision-making	Input in productive decisions
	Autonomy in production
Access to productive resources	Ownership of assets
	Purchase, sell or transfer of assets
	Access to and decisions on credit
Control over use over income	Control over use of income
Community leadership	Group member
	Speaking in public
Time allocation	Workload
	Leisure

Regarding the WEAI and various poverty, health, and nutrition outcomes, the WEAI score is most strongly associated with household educational achievement, income, and maternal behavior

(i.e., the prevalence of exclusive breastfeeding and children receiving a minimum acceptable diet). Higher women's empowerment scores are associated with higher rates of secondary school completion as the highest educational achievement within the household (Malapit et al. 2014). Higher rates of both exclusive breastfeeding and children achieving a minimum acceptable diet are also associated with greater women's empowerment scores.[1]

A woman is considered "empowered" in the 5DE if she has adequate achievements in four of the five domains or is empowered in some combination of the weighted indicators that reflect 80 percent total adequacy.[2] In addition to tracking the nature of empowerment in the five domains, because the WEAI also computes 5DE for men and compares this figure to the 5DE for women, the WEAI measures empowerment of women relative to that of men in the same household—which is critical to an understanding the gender empowerment gap (Alkire et al. 2012).

This study used the Abbreviated WEAI tool (A-WEAI). This tool, developed to shorten the time to implement the WEAI interviews by roughly 30 percent and to address challenges that had arisen during original WEAI baseline surveys, measures six indicators rather than 10, as follows:

Table 2. Indicators Measured by the Abbreviated Women's Empowerment in Agriculture Index

Domain	Indicators
Production decision-making	Input in productive decisions
Access to productive resources	Ownership of assets
	Access to and decisions on credit
Control over use over income	Control over use of income
Community leadership	Group member
Time allocation	Workload

Compared to the original WEAI using pilot data, the top two factors constraining women's and men's empowerment remained the same for A-WEAI. During the analysis of SPRING data, no instance of "input in productive decisions" was found and only one instance of "control over use of income" was found. Considering the limited contribution of these variables toward empowerment, the tables omit these results.

[1] See glossary for more information.
[2] See glossary for full definitions.

Methodology

SPRING analyzed two different sets of data for this study. The first was primary data collected by SPRING using the IFPRI tool. The second was existing data from IFPRI's BIHS. Both are described in greater detail below.

SPRING

This study used a cross-sectional survey of 371 women and their spouses in 16 upazilas who had completed training on the FNS curriculum; sampling methodology is explained below. Within this cross-sectional survey, SPRING compared empowerment levels of women to those of their husbands in three FNS trainee cohort groups to examine how empowerment had changed over the years after participation in the FNS program. Using BIHS data, we matched FNS women to similar women in non-SPRING areas (using propensity score matching or household assets and demographics) to see how the FNS was associated with the empowerment of men and women. Only 108 households were available for the matched comparison due to the limited number of households in non-SPRING areas in the BIHS dataset (resulting from SPRING's targeting of participant types—that is, in the poorest two quintiles, but with some land).

Sampling and Target Population

The target population for this research comprised pregnant and lactating women (PLW) who had been selected to participate in SPRING's FNS session at some point after SPRING began its work in 2013 (i.e., during FY13, FY14, or FY15). By definition, female FNS participants are either pregnant or with children under age two (in most cases less than a year old) and are from the two lowest wealth quintiles, based on the program's targeting criteria. A sample size of 768 was selected (384 FNS members and 384 spouses) from 48 FNS sites across the project's working area. The sampling system was as follows:

- Eight FNS sites were randomly selected from each year of implementation per division, for a total of 48 FNS sites.
- From each selected FNS site, eight participant women were randomly selected for an interview. In addition, two female alternates were selected from each site, also randomly, in case the selected women were not available on the day of the visit.

Inclusion and Exclusion Criteria

- Female interviewees had to have graduated from FNS in FY13, FY14, or FY15.
- Only those households where both male and female respondents were available were picked for the study. (The study skipped households without a dual-adult pairing.)
- Male interviewees had to be the spouse of the female FNS beneficiary.

- All respondents, both male and female, were interviewed separately, either simultaneously in different locations or at separate times.

Sample Attainment

In this study, data were collected from 16 upazilas of Barisal and Khulna divisions and 384 households were targeted from FNS catchment areas—24 households from each upazila. In addition, 12 households from each of the 16 upazilas were chosen as alternates. A total of 371 households were interviewed, including both the woman who had participated in the FNS session and her spouse. In addition, one woman was interviewed but not her spouse, as he was not available, despite repeated attempts to reach him. Table 3 gives a snapshot of the sample.

Table 3. Sample Attainment of SPRING A-WEAI Study

SL	Upazila	Target HH (A)	Visited HH (Target + Alternate) (B)	Interviewed HH (First Sample) (C)	Not Success HH (First Sample) (D)	Interviewed Second Sample (E)	Total Interviewed HH (First and Second Samples) (C+E)
1	Monirampur	24	36	23	1	0	23
2	Phultala	24	36	22	2	0	22
3	Dighulia	24	36	24	0	0	24
4	Rupsa	24	36	24	0	0	24
5	Dumuria	24	36	24	0	0	24
6	Narail Sadar	24	36	24	0	0	24
7	Kachua	24	36	24	0	0	24
8	Jhikargacha	24	36	23	1	0	23
9	Patuakhali Sadar	24	36	24	0	0	24
10	Gaurnadi	24	36	21	3	3	24
11	Wazirpur*	24	36	21	3	0	22
12	Bakerganj	24	36	14	10	8	22
13	Bauphal	24	36	17	5	5	22
14	Manpura	24	36	8	16	16	24
15	Daulatkhan	24	36	17	6	6	23

SL	Upazila	Target HH (A)	Visited HH (Target + Alternate) (B)	Interviewed HH (First Sample) (C)	Not Success HH (First Sample) (D)	Interviewed Second Sample (E)	Total Interviewed HH (First and Second Samples) (C+E)
16	Char Fasson	24	36	20	4	3	23
Total		384	576	331	51	41	371

Note: In one Wazirpur household, only the woman was available; this household was not counted in the household total.

Questionnaire Design and Content

SPRING used the predesigned questionnaire of the A-WEAI developed by IFPRI without editing or changes. For the convenience of enumerators and respondents, a Bangla version (translated and field tested by IFPRI) was used to help capture information precisely. The questionnaire elicited information on all 5DE but only the six indicators in the A-WEAI.

Because it was not possible to evaluate the extent of gender disparities by interviewing women alone, the individual questionnaire was administered separately to an adult male and an adult female in a dual-adult household.

In addition to the A-WEAI module, the questionnaire contained demographic information and an asset list to enable matching between FNS beneficiaries and the women in the BIHS survey. The questionnaire also contained information on access to health and agricultural extension services and the anthropometry of the children in the household. Each interview lasted for 45 minutes.

Informed Consent and Ethics

Ethical concerns related to participation were expected to be minimal and responses to individual surveys were kept private (i.e., male and female interviews were conducted at different times). An informed consent form was included at the beginning of the questionnaire to make clear to potential respondents that participation was completely voluntary. The questionnaire was identical to the A-WEAI tool developed and tested by IFPRI in several countries, including Bangladesh. Other questions were modeled on those in Bangladesh Demographic and Health Survey (BDHS) and other major surveys that have been used successfully and validated in varied settings There was no material benefit for participation and no penalty for nonparticipation for study participants.

Data Collection and Data Quality Control

Data collection began during the second week of December 2015 and continued for one and one half weeks. Data collection was done in teams, each team comprising one male and one female data collector. Fieldwork was supervised by SPRING/Bangladesh staff working alongside the data collectors. Questionnaires were reviewed by SPRING staff and the survey coordinator daily for quality control. Known errors and inconsistencies were corrected by revisiting households.

Enumerator Training

SPRING/Bangladesh and HKI trained interviewers to carry out the survey, eliminating the need to hire a research firm. HKI in Bangladesh has extensive experience with large survey management and has access to a pool of trainers, supervisors, and experienced enumerators, which SPRING/Bangladesh drew on for the study. It was originally envisioned that surveyor training would last five days. However, data collection officers were given six days of training plus one day of data collection field practice. Major topics covered by the training included: estimation of a child's age in the absence of a birth record; discussion of the questionnaire, including interview techniques; motivation and ethical issues; coding; data collection in tabs; and confidentiality. Classroom practice preceded field practice to ensure that data collection officers were adequately trained. The ensuing field visit ensured that all data collection officers had training needed to collect high-quality data.

Data Management

Data were collected using tablet computers so the data collection and data entry could be simultaneous. Collected data were reviewed nightly to check for quality and consistency. After checking consistencies, data were sent to the HKI server. After data were downloaded from the server, they were transferred into the Stata statistical package (version 13.1) for cleaning.

Constraints

The study design required that data be collected from female FNS participants as well as from their spouses. It was assumed that the spouse of a woman in a selected household would likely not be present at the time of the survey or might not be available at a convenient time. That this could lead to a reduction in the sample size was considered during sampling design, and suitable alternate households were identified.

Statistical Analysis

The description of the sample was based upon univariate analysis and was reported in terms of percentages for categorical variables and means for continuous variables along with their respective confidence intervals. An adjusted Wald test was carried out to understand the

significance of the differences in the estimates over divisions and years of implementation. The A-WEAI was constructed according to the guidelines produced by IFPRI (Malapit et al. 2015). Stata was used to analyze the data.

Strengths and Limitations

Data were collected for pairs of participants: a woman who had participated in an FNS session and her spouse. To gather information from both individuals, data collection officers sometimes had to revisit a household more than once (which was time consuming). In addition, some households could not be reached during the survey period, as they had migrated temporarily or permanently moved. However, the number of households that could not be reached was small and negligible.

In addition, SPRING may not have been the only actor in the study area to impact women's empowerment status. Other actors and media may also have contributed to improvement. SPRING data do not represent entire divisions but only SPRING working areas (40 upazilas across two divisions).

BIHS

A sound and appropriate statistical method was used to calculate the total BIHS[3] sample size of 6,500 households in 325 primary sampling units (PSUs, or villages). The BIHS design followed a two-stage stratified sampling: selection of PSUs followed by selection of households within each PSU, using the sampling frame developed from the community series of Bangladesh 2001 census. Sampling weights were further adjusted based on the 2011 census, the most recent census at the time of the survey.

During the first stage of sampling, the total BIHS sample, 325 PSUs, was allocated among the eight strata (seven divisions and the FTF ZOI), with probability proportionate to size (size being the number of households in each stratum). This resulted in the following distribution: 21 PSUs in Barisal, 48 in Chittagong, 87 in Dhaka, 27 in Khulna, 29 in Rajshahi, 27 in Rangpur, 36 in Sylhet, and 50 in the FTF ZOI.

[3]Details of BIHS sampling are available at: https://www.usaid.gov/sites/default/files/documents/1867/FTF-baseline-Bangladesh-Final-Report.pdf.

Findings

The goal of the research was to measure empowerment among FNS beneficiaries and to compare the average WEAI score among different cohorts of the FNS program and, using the BIHS data,[4] to women not participating in FNS activities.

The project wanted to better understand differences in male and female beneficiaries' involvement in daily household activities such as farming, work, leisure, decision making, access to resources, and related topics. It also sought to better understand the level of women's empowerment in agricultural activities and other aspects of family life.

The tables and narrative that follow attempt to describe the results of the research.

Table 4. Comparison of A-WEAI Results from SPRING and Non-SPRING Households

Indices	SPRING (Project Survey, 2016)		Non-SPRING (BIHS, 2015)	
	Women	Men	Women	Men
5DE Index (1-M_0)	0.72	0.75	0.60	0.79
Disempowerment Score (1-5DE) or M_0	0.28	0.25	0.40	0.21
Percentage of individuals achieving empowerment (1-H)	7.5%	35.4%	15.2%	49.3%
Percentage of individuals not achieving empowerment, H	92.5%	64.7%	84.8%	50.7%
Mean 5DE score for not-yet-empowered women (1-A)	0.70	0.61	0.53	0.58
Mean Disempowerment Score (1-5DE) for not-yet-empowered women (A)	0.30	0.39	0.47	0.42
Percent of women not achieving gender parity, H_{GPI}	41.8%		56.7%	
Percent of women achieving gender parity, H_{WGP} (=1- H_{GPI})	58.2%		43.3%	
Average empowerment gap (I_{GPI})	0.11		0.38	
Gender Parity Index (GPI [1-(H_{GPI}* I_{GPI})]	0.95		0.79	
A-WEAI score (0.9 x 5DE +0.1 x GPI)	0.75		0.62	
n=	108		108	

[4] The IFPRI baseline and/or midline for the FTF ZOI in Bangladesh was used as the comparison group. If the data were available, the midline survey was prioritized for matching.

Table 4 provides a comprehensive overview of WEAI results from the SPRING and BIHS studies. The A-WEAI scores and most other indices clearly showed that women who participated in SPRING's FNS scored better than women in areas covered by the BIHS (non-SPRING areas)—0.75 versus 0.62. In both cases, men were more empowered than women but BIHS men appeared to be slightly more empowered than the primary males in the households of women who had participated in SPRING's FNS. The gap between 5DE indices for men and women were higher in the BIHS. The average empowerment gap was much higher for women interviewed in BIHS, indicating that they had a long way to go to attain gender parity. The average empowerment gap seems to have contributed to the much lower GPI for BIHS women.

On average, women who had participated in SPRING's FNS scored higher on empowerment than women who had not participated (0.72 and 0.60, respectively). In contrast, although 15 percent of women who did not participate in SPRING's FNS were empowered, those disempowered were much further from empowerment, having inadequate achievement in 47 percent of domains.

The SPRING GPI showed that 58.2 percent of women had gender parity with the primary males in their households, which was greater than the gender parity for women who had not participated in SPRING's FNS (43 percent). For the remaining 41.8 percent of women who had not achieved gender parity, the average empowerment gap between them and their household males was 11 percent, compared to 38 percent in non-SPRING households. As a result, the SPRING GPI stood at 0.95, compared to 0.79 for non-SPRING. Better index results illuminate greater achievement of gender parity—a positive outcome of women's participation in SPRING's FNS.

Table 5. WEAI Indicators: SPRING versus Non-SPRING

	SPRING			NON-SPRING			Difference-in Differences (%)
	Baseline (2011/12)	Midline (2015)	% Difference	Baseline (2011/12)	Midline (2015)	% Difference	
Empowered headcount (female)	15.7%	51.5%	35.7	24.3%	49.8%	25.5	10.2
Empowered headcount (male)	45.95%	73.3%	27.4	50.3%	74.71%	24.4	3.0
5DE Index (female)	0.573	0.849	-	0.654	0.822	-	
5DE Index (male)	0.818	0.914	-	0.827	0.920	-	
% of women with gender parity	27.0%	54.4%	27.4	37.6%	55.80%	18.2	9.2%

Gender Parity Index (GPI)	0.732	0.936	-	0.81	0.915	-	
WEAI=(.9*5DE+0.1*GPI)	0.589	0.858	-	0.669	0.831	-	

Within SPRING, progress has been observed between participants of different project years and between divisions. SPRING participants have become more empowered than non-SPRING participants in terms of the WEAI index. Noticeable improvements had also been made by midline (see Table 5).

Over time, WEAI scores increased for both SPRING and non-SPRING participants, but the WEAI score was higher for SPRING than non-SPRING participants. The percentage difference between SPRING participants' baseline and midline was much higher than for non-SPRING participants. Within SPRING, the WEAI score increased remarkably between baseline and midline: 0.589 to 0.858.

The 5DE indexes increased for both SPRING and non-SPRING participants. In SPRING areas, the percentage difference was almost double that for non-SPRING areas. The 5DE Index results at midline were much more similar for both groups, although among SPRING participants, the change was greater over time and scores were slightly higher.

Differences for empowered females among SPRING participants were more than 10 percentage points higher than for non-SPRING participants. The difference for empowered males was also greater among SPRING participants. Both women's and men's empowerment scores increased, but in SPRING areas, women's empowerment increased more than men's.

Conclusions and Recommendations

Findings from SPRING's A-WEAI research revealed that women who participated in SPRING's intervention had higher empowerment scores than women who did not work with SPRING. On the other hand, basic empowerment scores were higher for women who did not participate in SPRING's FNS, and a larger proportion of women who participated in SPRING's FNS were ranked as "disempowered" with regard to their male head of household. Conversely, the research also indicated that women exposed to SPRING interventions saw greater improvements in empowerment over time than women who did not participate in SPRING FNS. It is plausible that over time, the intensive nature of SPRING's FNS intervention played a role in greater improvement in empowerment. Over nine months, all women participating in an FNS received at least two intensive visits per month by SPRING staff. Although lessons did not specifically address empowerment, they did focus on indicators of empowerment, such as production decision making, community leadership, and control over the use of income. Further, it is worth mentioning that the FNS model is based on two other evidence-based approaches: homestead food production and farmer field schools. Both of these interventions have been proven to show improvements in empowerment for women over time (Danida 2011) (Ianotti 2009). It is therefore likely that improvements seen in the study were due to the approaches upon which the FNS work was based.

Findings from this study are promising and indicate a strong likelihood that programs such as SPRING's FNS could be effective in empowering women. Although SPRING's FNS intervention did not specifically target men, it is important to consider greater involvement of men as a way to accelerate the empowerment of women. The results from analysis of data for SPRING versus non-SPRING upazilas in the FtF ZOI have shown that greater gender parity can be achieved when men are also empowered. Compared to platforms that focus on community engagement or other obvious components of empowerment, SPRING's FNS work focuses on bundling knowledge and skills around nutrition and small-scale food production as a primary channel through which other important lessons and skills around decision making and leadership may be taught. The useful nature of the lessons SPRING provides in its FNS work is one of the most engaging components and part of what both keeps women engaged and garners support from family and community. The end result, as seen in this report, is that both women and men gain skills around more than nutrition and food production; the FNS intervention also helps women become more confident and more productive, more empowered and better able to lead their communities. Thus, it is recommended that other projects seeking to affect empowerment do so through a similar "bundled" approach, targeting other specific skills.

Annex

Table 6. A-WEAI Results in SPRING Areas

Indices	SPRING Area	
	Women	Men
5DE Index (1-M_0)	0.72	0.77
Disempowerment Score (1-5DE) or M_0	0.28	0.23
Percentage of individuals achieving empowerment (1-H)	8.4%	41.5%
Percentage of individuals not achieving empowerment, H	91.6%	58.5%
Mean 5DE score for not-yet-empowered men/women (1-A)	0.70	0.61
Mean Disempowerment Score (1-5DE) for not-yet-empowered individuals (A)	0.30	0.39
Percent of women not achieving gender parity, H_{GPI}	45.3%	
Percent of women achieving gender parity, H_{WGP} (=1- H_{GPI})	54.7%	
Average empowerment gap (I_{GPI})	0.11	
GPI [1-(H_{GPI}* I_{GPI})]	0.95	
A-WEAI score (0.9x5DE +0.1xGPI)	0.75	
n=	371	

This analysis considered all of the surveyed households (n=371). Table 3 considered only matched samples (108 cases), so outputs are slightly different.

SPRING'S 5DE in Table 7 show 8.41 percent of women to be empowered. The remaining 91.6 percent who are not yet empowered have, on average, inadequate achievements in 30 percent of domains. Thus, the women's Disempowerment Index is 0.28 and the 5DE Index becomes 0.72. In the same area, 58.5 percent of men are not yet empowered, and the mean Disempowerment Score among these men is 0.39. So the men's Disempowerment Index is 0.23 and their 5DE is 0.77.

The GPI reveals that 54.7 percent of women have gender parity with the primary male in their household. The empowerment gap between the 45.3 percent of women who have not achieved gender parity and the men in their households is 11 percent. Thus, the overall GPI in SPRING areas is 0.95. Higher GPI contributes positively to the A-WEAI score.

Table 7. A-WEAI Results over SPRING Years of Implementation

Indices	SPRING 2013		SPRING 2014		SPRING 2015	
	Women	Men	Women	Men	Women	Men
5DE Index (1-M_0)	0.73	0.76	0.73	0.80	0.71	0.73
Disempowerment Score (1-5DE) or M_0	0.27	0.24	0.27	0.20	0.29	0.27
Percentage of individuals achieving empowerment (1-H)	6.9%	37.3%	10.1%	48.6%	6.7%	32.1%
Percentage of individuals not achieving empowerment, H	93.1%	62.7%	89.9%	51.4%	93.3%	67.9%
Mean 5DE score for not-yet-empowered individuals (1-A)	0.70	0.62	0.70	0.60	0.69	0.60
Mean Disempowerment Score (1-5DE) for not-yet-empowered individuals (A)	0.30	0.38	0.30	0.40	0.31	0.40
Percent of women not achieving gender parity, H_{GPI}	42.0%		48.1%		43.5%	
Percent of women achieving gender parity, H_{WGP} (=1- H_{GPI})	58.0%		51.9%		56.5%	
Average empowerment gap (I_{GPI})	0.11		0.11		0.11	
GPI [1-(H_{GPI}* I_{GPI})]	0.95		0.95		0.95	
A-WEAI score (0.9 x 5DE +0.1 x GPI)	0.75		0.75		0.74	

A-WEAI scores were same for female SPRING participants in 2013 and 2014, dropping slightly in 2015. Table 7 shows men to be consistently more empowered over time. In 2013 and 2014, the Empowerment Score for women was static while that for men increased substantially (from 0.76 to 0.81). In 2015, Empowerment Scores dropped for both men and women but men remained more empowered than women. The fixed average empowerment gap indicates that no changes occurred toward gender parity and that GPIs remained unchanged over the years. For women, the mean Disempowerment Score did not change that much over time. Women's empowerment fluctuated from 93.1 percent in 2013 to 89.9 percent in 2014 and 93.3 percent in 2015.

The 5DE for 2013 shows that 6.9 percent of women were empowered in the SPRING area. Achievements of the remaining 93.1 percent of women who did not achieve empowerment were inadequate in 30 percent of domains. Thus, the overall 5DE for SPRING in 2013 was 0.73.

The GPI for SPRING in 2013 illuminated the fact that 58.0 percent of women had achieved gender parity with the primary males in their households. The average empowerment gap between the other 42.0 percent of women (those who did not achieve gender parity) and the primary male in their household stood at 11 percent. Thus, the overall GPI for SPRING in 2013 was 0.95.

Similarly, the 5DE for SPRING in 2014 showed that only 10.1 percent of women were empowered. For the other 89.9 percent of women (those who did not achieve empowerment), achievements in 30 percent of domains were inadequate. Thus, the overall 5DE for SPRING 2014 was 0.73.

The GPI for SPRING in 2014 revealed 51.9 percent of women to have achieved gender parity with the primary male in their household. The average empowerment gap between the other 48.1 percent of women (those who did not achieve gender parity) and their primary household male stood at 11 percent. Thus, the overall GPI for SPRING in 2014 was 0.95.

Again, the 5DE for SPRING in 2015 revealed only 6.7 percent of women to be empowered. Achievements were inadequate for the other 93.3 percent of women, who did not achieve empowerment, in 31 percent of domains. The overall 5DE for SPRING in 2015 was 0.71.

The GPI for SPRING in 2015 showed 56.5 percent of women to have achieved gender parity with the primary male in their household. The average empowerment gap between the other 43.5 percent of women (those who did not achieve gender parity) and the primary male in their household stood at 11 percent. Thus, the overall GPI for SPRING in 2015 was 0.95.

In other words, the GPI did not decrease for the 2013 and 2014 groups, compared to the 2015 group, whose interventions were more recent.

Table 8. Distribution of Inadequacy Contributing to Disempowerment

Indicator	Percentage of Inadequacy	
	For Men	For Women
Ownership of assets	0.5%	6.5%
Access to and decisions on credit	29%	91.1%
Group membership	51.5%	13.2%
Workload	98.7%	100%
n=	371	371

Table 8 documents the inadequacy level[5] for four important indicators from the 5DE. Higher percentages correlate to greater disempowerment. In three cases, the inadequacy percentages are much higher for women than for the primary men member in their household. The only indicator contributing positively to the women's empowerment is group membership. Workload percentage of inadequacy is higher for women than for men, but the difference is minimal. In the case of access to and decisions on credit, the gap between men and women is high. The gap in ownership of assets between women and men is only 5.91 percent—but the figure for women is around 12 times higher than the figure for men.

The SPRING data analysis revealed no instance of input in productive decisions and only one instance of control over the use of income. Because these variables contributed to empowerment in only a limited way, data are not shown in the tables.

Table 9. Comparison in the Distribution of Inadequacy Contributing to Disempowerment between SPRING and Non-SPRING Areas

Indicator	Percentage of Inadequacy					
	For Men			For Women		
	SPRING	BIHS	p-Value	SPRING	BIHS	p-Value
Ownership of assets	0.9%	0%	0.3186	4.6%	23.1%	0.0001
Access to and decisions on credit	21.6%	21.5%	0.9936	91.7%	60.2%	0.0000
Group membership	53.7%	76.5%	0.0008	12.0%	78.8%	0.0000
Workload	99.1%%	34.5%	0.0000	100%	20.0%	0.0000
n=	108	85		108	104	

Four indicators show the differences in inadequacy percentages for men and women in SPRING and BIHS (Table 9). The analysis used more than 100 samples for each group. Statistical tests explored the significance of SPRING–BIHS differences for both for men and women. For men, the SPRING–BIHS differences were highly significant for group membership and workload and not statistically significant for the other two indicators. For women, the SPRING–BIHS differences were statistically significant for all four indicators. We can conclude from this analysis that

[5] "Using individual responses to the survey questions outlined above, each of the ten indicators are assigned a value of 1 if the individual's achievement is adequate, i.e., it exceeds the defined inadequacy cut-off for the specific indicator, and a value of 0 otherwise. An individual's empowerment or adequacy score is simply the weighted average of these ten indicators using the weights defined in Table 2.1. In other words, the empowerment score reflects the weighted percentage of dimensions in which a person has achieved adequacy." (https://www.ifpri.org/sites/default/files/Basic%20Page/weai_instructionalguide_1.pdf)

women who participate in SPRING's FNS are more empowered than women who did not participate in SPRING's FNS and that these findings are statistically significant.

Glossary

5DE Score: The 5DE score reflects the extent of women's empowerment in the 5DE. A higher score reflects greater empowerment.

Adequacy: An individual has achieved adequacy in an indicator if she or he has met or surpassed the threshold for that indicator.

Disempowerment Score: A figure found by subtracting the 5DE score from 1. A lower number reflects greater empowerment.

Empowerment gap: The average percentage shortfall that a woman lacking gender parity experiences relative to the primary male in her household.

Five Domains of Empowerment: The WEAI's first sub-index, the 5DE assess women's empowerment with respect to: decisions about agricultural production; access to and decision-making power over production resources; control over the use of income; leadership in the community; and time allocation.

Gender Parity Index: The GPI, the WEAI's second sub-index, measures women's empowerment relative to that of men by comparing the 5DE profiles of women and men in the same household. A woman is assumed to achieve gender parity if her achievements in the five domains are as high as or higher than the achievements of her household's primary adult male. The GPI is calculated only for women living in a household with a primary male decision maker.

GPI Score: Reflects the inequality in 5DE scores between a household's primary adult male and its female. A higher number reflects greater gender parity.

Income: Sole or joint control over income and expenditure.

Leadership: Membership in economic or social groups and comfort when speaking in public.

Production: Sole or joint decision making over food and cash-crop farming, livestock, and fisheries, as well as autonomy in agricultural production.

Resources: Ownership of, access to, and decision-making power over productive resources such as land, livestock, agricultural equipment, consumer durables, and credit.

Time: Allocation of time to productive and domestic tasks and satisfaction with the available time for leisure activities.

Women's Empowerment in Agriculture Index: The innovative WEAI—developed jointly by USAID, IFPRI, and the Oxford Poverty & Human Development Initiative (OPHI)—measures the extent of women's empowerment in the agricultural sector. It has two sub-indexes: the 5DE and GPI.

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