



Hearing their voices: Action research to support women's agency and empowerment in livestock vaccine distribution, delivery and use in Rwanda, Uganda and Kenya

Women Empowerment in Livestock Index (WELI) Baseline Report

RWANDA

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TABLE OF CONTENTS

1. Research Questions.....	1
This is the report of the Quantitative Data Analysis done to compliment the Qualitative Analysis Results.	1
1.1 Primary Research Questions.....	1
1.2 Secondary Research Questions	1
2. Study Methodology	2
3. Findings	3
3.1 Demographics	3
3.2 Women Empowerment	3
3.3 Contribution of empowerment indicators to WELI score	6
3.4 WELI score and demographic characteristics.....	7
3.5 Participation in livestock activities and related decision making.....	8
3.6 Participation and access to Vaccines/Preventive Care and information...	10
4. APPENDIX.....	13

LIST OF ABBREVIATIONS

WELI

LIST OF FIGURES

Figure 1: Share of respondents achieving adequacy per indicator by gender and household type.....5

Figure 2: Contribution of each indicator to disempowerment by gender7

Figure 3: WELI scores by gender of the respondent8

LIST OF TABLES

Table 1: Participants' age distribution.....	3
Table 2: Share of respondents attaining adequacy in terms of intrinsic agency.....	4
Table 3: Share of respondents attaining adequacy in terms of instrumental agency	4
Table 4: Share of respondents attaining adequacy in terms of collective agency	4
Table 5: WELI Results	6
Table 6: Relationship between WELI score and demographic characteristics	8
Table 7: Share of respondents participating in important livestock activities	9
Table 8: Relationship between empowerment level and participation in agricultural activities	9
Table 9: Share of respondents with access to information about vaccination by gender ..	10
Table 10: Share of respondents able to vaccinate livestock against RVF and NCD by gender	10
Table 11: Relationship between vaccine information access, administration, and empowerment level.....	11
Table 12: Relationship between empowerment level, vaccination rates and livestock death counts.....	11
Table 13: Relationship between self-reported vaccination knowledge among female livestock keepers and level of empowerment	12
Table 14: Description of the WELI Indicator construction	13

1. Research Questions

This is the report of the Quantitative Data Analysis done to compliment the Qualitative Analysis Results.

1.1 Primary Research Questions

The primary research questions to be addressed include:

1. Do WELI scores or percentage of indicators achieved differ significantly from baseline to post intervention?
2. Is there an association between gender of respondent and level of empowerment within the livestock sector once they are both adjusted for?
3. Which dimension contributes more to empowerment? E.g., Does control and use of income influence the score the most?
4. Is there an association between perceived extent of participation in vaccination among female livestock keepers and level of empowerment within the livestock sector?

1.2 Secondary Research Questions

Secondary research questions include:

2. Study Methodology

2.1 The research is based on a pre-post design.

2.1.1 Intervention

2.1.2 Sample Size

2.1.3 Data collection

3. Findings

3.1 Demographics

The socio-demographic profile of 344 survey respondents with complete data is described to provide context on the study population. Female respondents represent 79% (271/344) of the sample; 82% (222/271) from dual male-female adult households and 18% (72/271) from female-adult only households. In total 72 male respondents were included in the analysis, out of 95 males interviewed. The 23 males were dropped from the sample due to missing female counterparts.

The median age was 46 years (IQR: 37-54) and 40 years (IQR: 34-48) for male and female respondents, respectively.

Table 1: Participants' age distribution

	Male (Dual adult male female HHs)	Female (Dual adult male female HHs)	Female (Adult female only)	All Female
Mean age (SD)	44 (12)	40 (10)	47 (11)	41 (11)
Median age (Years)	46	39	44	40
Interquartile range	37-54	33-46	39-55	34-48
Min-Max age	20-80	20-71	26-72	20-72
No. of observations	72	221*	50	271

*1 female respondent's age was missing.

3.2 Women Empowerment

We describe the empowerment level of women in this study using three domains, namely **intrinsic agency**, **instrumental agency**, and **collective agency**. Each respondent is classified as either adequate (=1) or inadequate (=0) in a given indicator by comparing their responses to the survey questions with a given threshold (**Table 14**).

1. **Intrinsic agency** – this refers to the ‘power within’, that is the process by which one develops a critical consciousness of their own aspirations, capabilities, and rights. In this study the respondent’s intrinsic agency is assessed using four indicators: autonomy in the use of income from agricultural and non-agricultural activities, self-efficacy, their attitudes about domestic violence, and respect among household members.

The study found (**Table 2**) that overall, at least half of the respondents had attained adequacy in the four indicators. We find significant differences in the share of women and men adequate in terms of self-efficacy and respect among household members; The percentage of male respondents adequate when it comes to self-efficacy (59.7% vs 35.3%) and respect among household members (89.9% vs 61.8%) was significantly higher compared to women.

Table 2: Share of respondents attaining adequacy in terms of intrinsic agency.

	Male Count (%)	Female Count (%)	Chi-sq test (p-value)
Autonomy in income use	66 (91.7)	254 (93.4)	0.258 (0.611)
Self-efficacy	43 (59.7)	96 (35.3)	14.108 (<0.001)
Attitudes about domestic violence	69 (95.8)	244 (89.7)	0.2607 (0.106)
Respect among household members	64 (89.9)	168 (61.8)	19.076 (<0.001)
No of observations	71	272	

2. **Instrumental agency** – also known as ‘power to’, refers to the ability of one to take strategic action to achieve their self-defined goals. We use the respondent’s input in overall productive decisions, input in productive decisions relating to livestock, ownership of land and other assets, access to and input on decisions concerning credit, control over used of income in the household, work-life balance, and ability to visit important locations outside home.

We note (**Table 3**) that a significantly higher proportion of men (63.9% are adequate in terms of work balance compared to women (27.6%). At least four-fifths of the respondents, are adequate in 6 out of the 7 indicators in this category, irrespective of the gender.

Table 3: Share of respondents attaining adequacy in terms of instrumental agency

	Male Respondents (%)	Female respondents (%)	Chi-sq (p-value)
Input in productive decisions	70 (97.2)	248 (91.2)	2.978 (0.084)
Input in productive decisions – livestock	64 (92.8)	222 (88.1)	1.210 (0.271)
Ownership of land other assets	72 (100.0)	269 (98.9)	0.801 (0.371)
Access to and decisions on credit	71 (98.6)	265 (97.4)	0.352 (0.553)
Control over use of income	62 (86.1)	234 (86.0)	0.0003 (0.986)
Work balance	46 (63.9)	75 (27.6)	32.927 (<0.001)
Visiting important locations	71 (98.6)	265 (97.4)	0.352 (0.553)
No of observations	72	272	

3. **Collective agency** – describes the ability to be part of and/or mobilize people around common or shared concerns. This is captured by the group membership indicators.

We find (**Table 4**) that majority of the respondents are adequate in regard to collective agency, and this does not vary by gender.

Table 4: Share of respondents attaining adequacy in terms of collective agency

	Male Respondents (%)	Female respondents (%)	Chi-sq. (p-value)
Group membership	63 (87.5)	226 (83.1)	0.825 (0.364)
Influential Group membership	61 (84.7)	212 (77.9)	1.598 (0.206)

No of observations	72	272	
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Overall, the results (**Figure 1**) show that women have challenges in three indicators – work balance, self-efficacy, and respect among household members, whereas men tend to struggle with two indicators - work balance and self-efficacy.

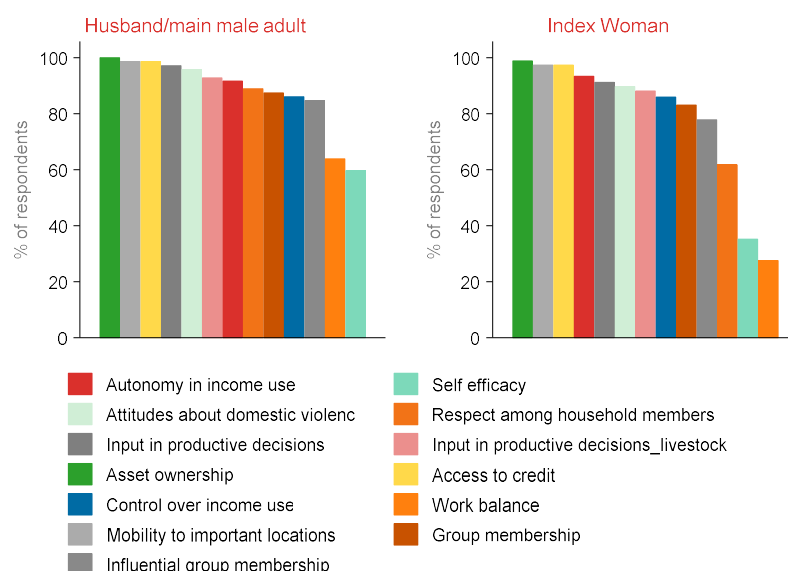


Figure 1: Share of respondents achieving adequacy per indicator by gender and household type.

WELI RESULTS/SCORE

The respondent's overall empowerment score was computed as the weighted average of her/his adequacy scores in the 13 indicators (all weighted 1/13). If their score is at least 75%, or if he/she is adequate in nine out of the 13 indicators, then that respondent was classified as empowered.

Conversely, if the score was below 75%, or if inadequate in 4 or more indicators, then that respondent is classified as disempowered. These individual level scores were then aggregated to construct WELI score which is the weighted mean of two sub-indices: the Three Domains of Empowerment Index (3DE), with a weight of 90 percent, and the Gender Parity Index (GPI), with a weight of 10 percent.

Note that, when constructing GPI only households where two adults, the man and woman were interviewed, were considered. In total, we analyzed data from 72 dual male-female adult households.

We learn (**Table 5**) that the aggregate WELI score for women in this study is 0.92; this is a weighted average of the 0.91 3DE score of women and 0.95 GPI score. We take notice of the fact that the share of empowered men (95.8%, 95% CI: 91.2% - 100.0%) is significantly higher than women (76.8%, 95% CI: 71.8 - 81.8%).

Of those women and men who are not yet empowered, the mean adequacy score is 0.33 and 0.38, respectively; therefore, these women and men achieve adequacy in an average of 33% and 38% of the indicators, respectively.

The study found that approximately 75% of the households achieved gender parity. The average empowerment gap between women who do not achieve gender parity and the men in their households is 21%.

Table 5: WELI Results

Indicator	Men	Women
Number of observations	72	272
3DE score	0.99	0.91
Disempowerment score (1 – 3DE)	0.01	0.09
% Achieving empowerment	95.7%	75.8%
% Not achieving empowerment	4.3%	24.2%
Mean 3DE score for not yet empowered	0.69	0.64
Mean disempowerment score (1 – 3DE)	0.31	0.36
Gender Parity Index (GPI)		0.96
Number of dual-adult households		72
% Achieving gender parity		76.9%
% Not achieving gender parity		23.1%
Average empowerment gap		0.18
WELI score		0.92

3.3 Contribution of empowerment indicators to WELI score

To identify the main factors contributing to disempowerment of respondents in this study, the disempowerment index was decomposed by indicator. We find (**Figure 2**) that self-efficacy, respect among household members, work balance, community group membership contributes most to women's disempowerment.

The indicators that contribute to men's disempowerment include membership in influential groups, work balance, and self-efficacy.

Note that the overall disempowerment score was 0.09 and 0.01 for women and men, respectively.

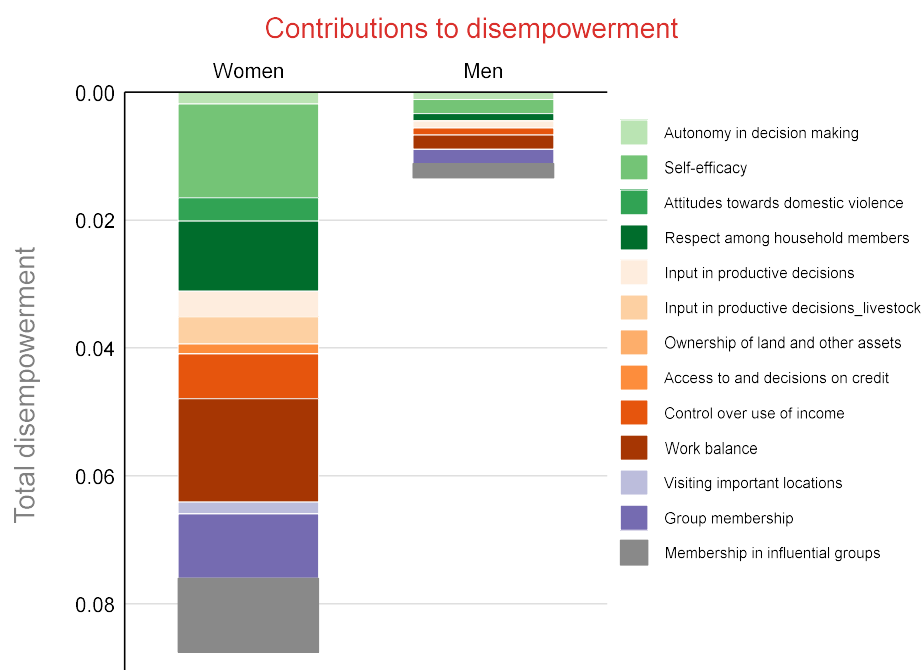


Figure 2: Contribution of each indicator to disempowerment by gender

3.4 WELI score and demographic characteristics

Next, we explore the relationship between the individual WELI score as a continuous variable and livestock farming activities. The WELI score was computed as the percentage of respondents achieving adequacy in each indicator, that is 1-Weighted Inadequacy count. Looking at the distribution of WELI scores by gender (**Figure 3**) there's significant difference in WELI score between men and women; at least 50% of the men were adequate in more than 92% of the indicators whereas half of the women are adequate in more than 83% of the indicators.

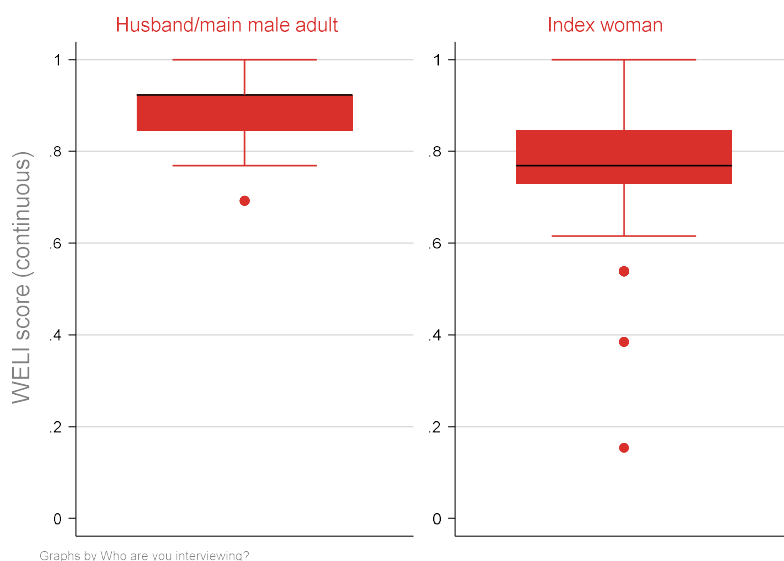


Figure 3: WELI scores by gender of the respondent

We run a generalized linear regression model using the continuous WELI score as the dependent variable to test the hypothesis that men have higher empowerment scores than women and those older women or men have higher empowerment scores than younger women or men. The results (**Table 6**) show that there exists a statistically significant relationship between the respondent's gender and WELI score, after adjusting for age. This coefficient was significant at 5% level. We find that the WELI score of women is 10% lower compared to men, after adjusting for the respondents' age. WELI score does not vary by age of the respondent.

Table 6: Relationship between WELI score and demographic characteristics

Covariate	Exp (b)	[95% CI]	P-value
Respondent's gender (Ref group = Male)	0.90	0.87-0.93	<0.001
Respondent's age in years	0.99	0.998-1.00	0.851

Number of observations (n=343); Age missing for 1 respondent

3.5 Participation in livestock activities and related decision making.

The aim of this section is to determine whether empowered women feel that they can participate to a great extent in vaccinating their animals or if their perceived extent of involvement is inversely related or not at all. We begin by exploring the participation of women and men in important livestock activities. In this section, we include households that were carrying out a specific livestock activity; the total number of households included varies by livestock activity.

We find that participation of women and men in important livestock activities does not vary significantly in majority of the activities (at least 5). There were significant gender differences in participation in animal feeding, slaughtering of animals and breeding (**Table 7**).

Table 7: Share of respondents participating in important livestock activities

Activity	Men Count (%)	Women Count (%)	Chi-sq. (p-value)
Animal feeding (a)	35 (85.4)	159 (96.4)	7.240 (0.007)
Total number of non-missing observations	41	165	
Checking animal health (d)	34 (87.2)	116 (80.0)	1.052 (0.305)
Total number of non-missing observations	39	145	
Disease preventive measures (e)	22 (75.9)	63 (56.8)	3.519 (0.061)
Total number of non-missing observations	29	111	
Milking animals (g)	6 (66.7)	3 (11.5)	—
Total number of non-missing observations	9	26	
Cleaning animals (i)	20 (64.5)	79 (74.5)	1.200 (0.273)
Total number of non-missing observations	31	106	
Slaughter animals (j)	7 (63.6)	15 (29.4)	4.630 (0.031)
Total number of non-missing observations	11	51	
Breeding (l)	8 (57.1)	14 (28.6)	3.911 (0.048)
Total number of non-missing observations	14	49	
Marketing of live animals and products from live animals (p)	18 (94.7)	49 (83.1)	1.620 (0.203)
Total number of non-missing observations	19	59	
Selecting which species and breeds to rear (q)	5 (100.0)	9 (69.2)	-
Total number of non-missing observations	5	13	
Sharing livestock workload among household members (r)	27 (96.4)	81 (91.0)	0.880 (0.348)
Total number of non-missing observations	28	89	

We look at the relationship between the number of agricultural activities, a respondent is involved in versus empowerment level. This is done by running a multiple generalized linear regression model with WELI score as the dependent variable, against the two covariates, and adjusting for gender, and age.

We find (**Table 8**) that the WELI score does not depend on the number of activities a farmer is involved in, at 5% significance level.

Table 8: Relationship between empowerment level and participation in agricultural activities

Covariate	Exp (b)	[95% CI]	P-value
Number of agricultural activities in which individual participates in	1.00	0.98-1.02	0.921
Gender of the respondent (Ref group = Male)	0.90	0.87-0.93	<0.001

Respondent age	0.99	0.99-1.00	0.871
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No of observations = 343

3.6 Participation and access to Vaccines/Preventive Care and information

When we look at the differences in how the respondent's opinion about their ability to access information regarding vaccinating goats and chicken, we find that there is no observable difference by gender (**Table 9**). Overall, only 31% of men and 19% of women have access to information about any of the two vaccines.

Table 9: Share of respondents with access to information about vaccination by gender

Access to information about vaccination	Men Count (%)	Women Count (%)	Chi-sq. (p-value)
Have access to information regarding vaccinating goats for RVF	23 (42.6)	78 (37.5)	1.784 (0.410)
Total number of non-missing observations	54	208	
Have access to information regarding vaccinating chicken for NCD	30 (53.6)	77 (41.9)	4.590 (0.101)
Total number of non-missing observations	56	184	
Have access to information regarding any of the two vaccinations	14 (31.1)	26 (19.4)	2.661 (0.103)
Total number of non-missing observations	45	134	

The survey also sought to find out how the respondents feel about vaccinating their goats, and chicken against RVF and NCD, respectively. The results (**Table 10**) show no difference between men and women when it comes to ability to administer the vaccines against RVF, and NCD.

Table 10: Share of respondents able to vaccinate livestock against RVF and NCD by gender

Ability to carry out vaccination	Men Count (%)	Women Count (%)	Chi-sq. (p-value)
Farmer is able to vaccinate goats against RVF	23 (42.6)	78 (37.5)	0.469 (0.493)
Total number of non-missing observations	54	208	
Farmer is able to vaccinate chicken against NCD	30 (53.6)	77 (41.9)	2.388 (0.122)
Total number of non-missing observations	56	184	
Able to vaccinate livestock against any of the two diseases	37 (68.5)	110 (64.0)	0.377 (0.539)
Total number of non-missing observations	54	172	

To understand whether empowered women feel that they can participate to a great extent in vaccinating their animals or if their perceived extent of involvement is inversely related or not at all, we fit simple generalized linear regression models with WELI score as the dependent variable. We find (**Table 11**) that there is a statistically significant and positive relationship between perceived ability to access information regarding vaccination: a farmer with moderate

or high perceived ability to access information regarding vaccination is likely to have 6% increased WELI score compared to one with none or little access to the vaccination information.

Further, we checked whether attending trainings about livestock health helps to empower women. Note that all the respondents in this indicator attended training sessions about goat or chicken health in the past 12 months, therefore no test was done.

Table 11: Relationship between vaccine information access, administration, and empowerment level

Independent variables	Exp (b)	[95% CI]	P-value
Perceived ability to access information regarding vaccination (Ref group = None/small extent). No of observations = 134	1.06	1.01-1.12	0.030
Able to vaccinate livestock against RVF or NCD (Ref group = No). No of observations = 175	0.98	0.94-1.02	0.289
Attended training about goat or chicken health in the past 12 months (Ref group = No). No of observations = 16	-	-	-

We sought to explore whether a woman's empowerment level was associated with the reported vaccination rate and number of RVF, and NCD related deaths. A simple log-binomial regression model was fitted with the vaccine rate as a binary response variable and WELI score as the independent. We find (Table 12) no significant relationship between the rate of vaccination and a woman's empowerment score at 5% level.

Two simple negative binomial regression models were run using RVF and NCD related death counts as response variables, with empowerment score as the explanatory variable. The choice of negative binomial regression over Poisson models was informed by the overdispersion in the response variables.

The results show no statistically significant relationship between (i) the vaccination rate (ii) reported RVF deaths, and (iii) reported NCD deaths in the past 12 months and a woman's empowerment score.

Table 12: Relationship between empowerment level, vaccination rates and livestock death counts

Dependent variables	Model used	Exp (b)	[95% CI]	P-value
Vaccination rate No of obs. = 135	<i>Log binomial model (Reporting Risk ratio)</i>	2.27	0.06-89.9	0.663
Reported number of RVF deaths in the past 12 months. No of obs. =208	<i>Negative binomial regression (Reporting Incidence Rate ratio)</i>	1.94	0.22-17.13	0.549
Reported number of NCD deaths in the past 12 months. No of obs. =184		0.22	0.05-1.01	0.051

Lastly, we explore the impact of the respondent's knowledge about vaccines on their overall empowerment score. For the question about the respondent's knowledge extent about animal

health, the response was recoded to a binary score where 0 represents “Not at all/small extent” and 1 represents “Medium extent/High extent”. This recoding criterion is consistent with the approach used when creating the WELI study indices, particularly on input in productive decisions.

A multiple generalized linear model was fitted with WELI score as the response variable and the three indicators (**Table 13**) as the covariates. We found no association between (i) respondent’s knowledge of where to purchase vaccines against RVF or NCD or (ii) being knowledgeable about animal health, or (iii) access to information regarding the vaccines RVF or NCD and the empowerment level.

Table 13: Relationship between self-reported vaccination knowledge among female livestock keepers and level of empowerment

Covariates	Exp (b)	[95% CI]	P-value
Knows where to purchase vaccine against RVF or NCD (Ref group = No);	0.99	0.92-1.07	0.891
Knowledgeable about animal health, goat or Chicken (Ref group = Not at all/small extent)	1.01	0.95-1.10	0.697
Have access to information regarding any of the two vaccinations (Ref group = No)	1.03	0.95-1.12	0.444

No of observations = 122

4. APPENDIX

Table 14: Description of the WELI Indicator construction

Indicator A	Definition of adequacy
Intrinsic Agency	
Autonomy in income	<p>More motivated by own values than by coercion or fear of others' disapproval: <i>Relative Autonomy Index B score</i> ≥ 1</p> <p>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)</p>
Self-efficacy	"Agree" or greater on average with self-efficacy questions: <i>New General Self-Efficacy Scale C score</i> ≥ 32
Attitudes about intimate partner violence against women	<p>Believes husband is NOT justified in hitting or beating his wife in all 5 scenarios: D</p> <p>1) She goes out without telling him</p> <p>2) She neglects the children</p> <p>3) She argues with him</p> <p>4) She refuses to have sex with him</p> <p>5) She burns the food</p>
Respect among household members	<p>Meets ALL of the following conditions related to their spouse, the other respondent, or another household member:</p> <p>1) Respondent respects relation (MOST of the time) AND</p> <p>2) Relation respects respondent (MOST of the time) AND</p> <p>3) Respondent trusts relation (MOST of the time) AND</p> <p>4) Respondent is comfortable disagreeing with relation (MOST of the time)</p>
Instrumental Agency	
Input in productive decisions	<p>Meets at least ONE of the following conditions for ALL of the agricultural activities they participate in</p> <p>1) Makes related decision solely,</p>

Ownership of land and other assets	2) Makes 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)
	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
Access to and decisions on financial services	3) Land
	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
Control over use of income	Has input in decisions related to how to use BOTH income and output from ALL of 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
Work balance	Works less than 10.5 h per day:
	Workload = time spent in primary activity + (1/2) time spent in childcare as a secondary activity
Visiting important locations	Meets at least ONE of the following conditions:
	1) 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
Collective Agency	
Group membership	Active member of at least ONE group
Membership in influential groups	Active member of at least ONE group that can influence the community to at least a MEDIUM extent