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Intrahousehold empowerment patterns, gender power relations, and food security in Uganda

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Abstract

This study examined (a) the relationship between women's empowerment, men's empowerment, and food security within households and (b) the effect of gender power in households on the food security status of women and men in Uganda's fishing villages using NutriFish project data ($N = 762$). An inaugural intersectional gender analysis approach applied the *project-level Women's Empowerment in Agriculture Index* (pro-WEAI), categorizing indicators into five domains: decision making, labor sharing, resource access, norms and beliefs, and gender parity within households. Binary logit models were computed, including interactions between the empowerment of women and men, controlling for individual- and household-level characteristics, and stratified by gender and occupation (i.e., fishing vs. non-fishing) to account for context differences. Results showed that empowering women in non-fishing groups enhanced food security for both genders, regardless of men's empowerment. In fishing groups, women's food security improved most when their partners were already empowered, while men's empowerment remained relatively unaffected. Notably, the norms and beliefs domain was strongly linked to food security, except for non-fishing men. Context-specific

gender interventions and analyses are vital to address food security disparities and critical to informing project implementers and policymakers in gender- and nutrition-sensitive development projects to target the most vulnerable groups.

KEYWORDS

context specific, food security, gender analysis, intersectionality, small-scale fisheries, Uganda, women's empowerment

1 | INTRODUCTION

All over the world, food insecurity experienced by women is not equal to food insecurity experienced by men (Broussard, 2019; Food and Agriculture Organization [FAO] et al., 2023; Sinclair et al., 2019). In the poorest regions, including South-of-Sahara Africa (SSA), women are two percentage points more likely than men to be severely food insecure (Broussard, 2019). Our study concerned food security and gender.

The World Health Organization (WHO, 2020a) defined gender as "socially constructed roles, behaviours, expressions, and identities," recognized under the gender binary as "man" and "woman." Sex, on the other hand, refers to biological characteristics at birth, categorized as "male" or "female" or "intersex" (Morgan et al., 2016; WHO, 2002). Food security exists "when all people, at all times, have social, physical, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life" (FAO, 2001, p. 49).

Current knowledge about food security and gender is largely based on empirical studies that investigated the relationship between women's empowerment and their own food security (Asitik & Abu, 2020; Aziz et al., 2020; Bhandari & Burroway, 2018; Sraboni et al., 2014; Wei et al., 2021) or their households (Asitik & Abu, 2020; Aziz et al., 2021; Bain et al., 2020; Clement et al., 2019; Essilfie et al., 2021; Galiè et al., 2019; Murugani & Thamaga-Chitja, 2019; Sariyev et al., 2020; Sharaunga et al., 2016; Tsiboe et al., 2018; Zereyesus, 2017). Although empirical evidence of the positive association between women's empowerment and food security is growing, it is still inconclusive (Asitik & Abu, 2020; Aziz et al., 2020, 2021; Bain et al., 2020; Clement et al., 2019; Essilfie et al., 2021; Galiè et al., 2019; Sariyev et al., 2020; Tsiboe et al., 2018; Wei et al., 2021).

For example, Murugani and Thamaga-Chitja (2019) found that increasing the input of women in decision making, their access to credit and opportunities to speak in public were associated with an increase in household dietary diversity as a proxy of measuring household food security status in South Africa. Sraboni et al. (2014) reported that, per capita, calorie availability was greater for empowered women than disempowered women in Bangladesh. They also reported a positive relationship between the equal decision-making rights of women with household livelihoods and their dietary quality. Kehinde et al. (2021), however, found that women's achievement in productive decision making and credit access was associated with an increase in the severity of food insecurity.

In a critical review of the literature regarding the relationship between women's empowerment and food security, Barak (2023) identified a gap in the way food security and women's empowerment are conceptualized and operationalized in different stages of agricultural development programs, including design, data collection, analysis, and interpretation. They argued that the absence of evidence does not indicate the lack of an underlying connection between women's empowerment and food security. Instead, they are related, and further research is needed. The inconclusive association between empowering women and food security could also reflect other shortcomings and challenges, such as the gap in studying intrahousehold gender dynamics, lack of an intersectional lens, and absence of mixed methods approaches to unpack contextual variations.

Barak (2023) recommended using context-specific and mixed-methods approaches to more effectively address programs aimed at empowering women to improve food security. Both food security and women's empowerment are nuanced phenomena, and contributing factors are context specific, specifically from the perspective of gender power relations (Akter et al., 2017; Galiè et al., 2019). For this reason, it may not be enough to rely solely on standardized quantitative measures as they do not account for the complex sociocultural norms that shape values, meanings, and identities (Bonis-Profumo et al., 2022; Galiè et al., 2019; O'Hara & Clement, 2018). Researchers should recognize the significance of qualitative data in interpreting quantitative results, especially in the context of gender and food systems (Akter et al., 2017; Clement et al., 2019; Galiè et al., 2019; O'Hara & Clement, 2018). We support this assertion with several examples.

In their mixed-method Ugandan study, Bain et al. (2020) showed that women's empowerment resulting from cattle ownership was positively associated with household food security. Women's cattle ownership challenged social norms associated with household and agricultural gender inequality and, overall, enhanced women's empowerment, gender equity, and household food security.

In another mixed-method cattle-ownership study in Tanzania, Galiè et al.'s (2019) quantitative survey data yielded no significant association between three domains of empowerment (i.e., assets, income, and time use) and food security in the livestock sector. However, the focus group discussions (FDGs) showed that women's empowerment was an effective strategy for bettering their food security status. Galiè et al. (2019) attributed the difference between the quantitative results and qualitative findings to the absence of considering sociocultural determinants of empowerment in the quantitative measurements, namely, gender norms and power relations.

From a household perspective, most studies that were focused on the effect of women's empowerment overlooked the empowerment status of their male counterparts in the household (Asitik & Abu, 2020; Aziz et al., 2020, 2021; Bain et al., 2020; Clement et al., 2019; Essilfie et al., 2021; Galiè et al., 2019; Tsiboe et al., 2018; Wei et al., 2021) and the potential interactions between them, which was referred to herein as "intrahousehold empowerment patterns" following Malapit et al.'s (2019) protocol. The probability of food security, either at the individual or household level, might change depending on women's and men's empowerment status in households (Gebre et al., 2021; Zingwe et al., 2023).

To elaborate, in their Ethiopian mixed method study, Gebre et al. (2021) found significant differences in the probability of food security among three categories of households: male, female, and joint decision-making farm households. In their Malawian study, Zingwe et al. (2023) showed that dual-adult households (DHHs), which included both a male and female adult, had better household food security status than female-adult-only households (FHHs). Additionally, among DHHs, those with a dominant female voice (i.e., bargaining power) were more likely to be food secure compared with a male-dominant voice.

Some studies have investigated intrahousehold empowerment patterns by measuring household gender parity (i.e., the difference between men's and women's empowerment levels) (Diiro et al., 2018; FAO, 2011; Kehinde et al., 2021; World Bank, 2014). For example, the food security of Bangladeshi households was associated with gender parity (Sraboni et al., 2014). Similar findings were reported in a matrilineal context in Bhutan, where gender equality in decision making was related to an increase in household food security (Sariyev et al., 2020). They suggested that an imbalance in gender equality in either direction adversely affected food security. Their view was recently supported by Quisumbing et al. (2021) who analyzed the differences between empowerment outcomes of the primary male and female decision maker in the household, defined as *intrahousehold inequality*. They highlighted the importance of considering the sociocultural context when implementing interventions aimed at empowering women.

Several scholars have identified gender power relations as a significant barrier to food security (e.g., Gebre et al., 2021; Morgan et al., 2016, 2017; Ragasa et al., 2019). Some of the barriers that Gebre et al. (2021) and others have identified include unequal access to economic, human, and social resources in addition to related gender norms and beliefs that affect roles, behaviors, and decision-making power between and among men and women. Understanding how gender power relations are constituted and negotiated within the household can, thus, help capture the complex gender dynamics associated with the food security status of men and women separately or jointly.

Indeed, some scholars have suggested that analyzing just women's overall empowerment status may not suffice to unpack the positive effects this status has on food security (Essilfie et al., 2021; Quisumbing et al., 2021; Tsiboe et al., 2018; Wei et al., 2021). Quisumbing et al. (2021) posited there can be tradeoffs between the dimensions of empowerment, underlining that empowerment in one dimension might result in disempowerment in another. More in-depth analysis of gender power relations within households can model the dimensions of women's and men's empowerment that affect food security outcomes.

To illustrate, Ragasa et al. (2019) examined the determinants of food security in Malawi in gendered household types: dual-headed, sole male adults, and sole female adults. They reported that using training sessions to provide women with empowerment opportunities was unsuccessful because training increased study participants' time poverty, and because women had limited power to apply the lessons to benefit their households. Ragasa et al. concluded that joint (men and women) access to information was a more effective strategy to enhance food security than only increasing women's access. Men's and women's contributions to household food security could be elucidated by considering the relative positions of power occupied by genders in households (Morgan et al., 2016; Ragasa et al., 2019).

1.1 | NutriFish project in Uganda

Previous research provides limited knowledge in accounting for gender power relations in studying the relationship between women's empowerment and food security. To address this gap, we used the *project-level Women's Empowerment in Agriculture Index* (pro-WEAI) to conduct a gender analysis of baseline survey data (secondary data) from the Ugandan NutriFish project that was conducted from May 2019 to March 2023. As a caveat, in pro-WEAI, the term *agriculture* is a broad term encompassing all types of food production, including *fisheries*. NutriFish was a gender- and nutrition-sensitive agricultural development project within the fish value chain in Ugandan fishing villages (International Development Research Centre [IDRC], 2024).

The intent of NutriFish was to harness dietary nutrients from underutilized fish and fish-based products in Uganda. Severe lack of available fish for myriad reasons has created a pressing need for healthy food sources. IDRC (2024) remains convinced that the fisheries provide "opportunities to reduce hunger, improve nutrition, alleviate poverty, and generate economic growth" (para. 1), especially by empowering women via enhancing their economic capacities through intentional inclusion in fish "product development, marketing, and entrepreneurship strategies" (para. 3).

The overall goal of NutriFish was thus to increase the availability, accessibility, and consumption of underutilized small fish by (a) upgrading the existing value chain and (b) processing by-products that come from the wasted parts of larger and more expensive fish, like Nile perch, thus creating a new value chain. NutriFish further aimed to (a) increase the number of women actively involved in fisheries' value chains (e.g., by increasing their involvement in value chain nodes, such as processing) and (b) expanding women's opportunities to operate in newly created value chains (e.g., marketing new fish products) (IDRC, 2024).

Uganda is one of the fastest growing African countries with a population growth of 3% per year. Uganda also faces the challenge of having one of the largest refugee populations in Africa (United States Agency for International Development [USAID], 2021; World Food Programme [WFP], 2022). The country produces enough food to feed the whole population; yet food insecurity is a major public health concern (WFP, 2022). Recent statistics report an increase in the prevalence of food insecurity with 74% of the Ugandan population suffering from moderate to severe food insecurity (FAO et al., 2023). Moreover, Uganda ranked 166 among 191 countries on the *Gender Inequality Index* (United Nations Development Programme [UNDP], 2022).

In Uganda, the fisheries are a major food source and play an essential role in the country's livelihoods and economies. Owing to their significance in the African food basket, small-scale fisheries have received increased attention in food security initiatives and policies in the last decade (Chan et al., 2019; FAO, 2020; March & Failler, 2022). Our Uganda-based study, hence, aimed to (a) assess how the predicted probability of food security differed in each intrahousehold empowerment pattern when disaggregated by gender (men and women in each household) and occupation as a proxy for context (i.e., fishing and non-fishing) and (b) understand whether the various gender dynamic domains were associated with both women and men's food security status. Associated hypotheses are explained in Section 2.

2 | METHODS

2.1 | Empowerment: Concepts and measurements

Empowerment was measured using pro-WEAI, which is adapted from the widely used WEAI to measure women's and men's empowerment in agricultural development interventions (Malapit et al., 2019). Pro-WEAI was built on Kabeer's (1999) definition, wherein empowerment is conceptualized as three interrelated dimensions: resources (pre-conditions), agency (process), and achievements (outcomes).

In more detail, Kabeer (1999) proposed that agency is "the ability to define one's goals and act upon them" (p. 438). It can take various forms that are not only decision-making measurements. The pro-WEAI identifies different forms of agency based on three domains of empowerment (3DE): intrinsic agency (power within), instrumental agency (power to), and collective agency (power with). The aggregated pro-WEAI index comprises two sub-indices: 3DE and the

Gender Parity Index (GPI). The 3DE measures the degree to which respondents are empowered, mapped into 12 indicators (to be discussed).

Pro-WEAI survey respondents are categorized based on their responses to each of the 12 indicators. An adequate response to each indicator is given a score of 1, while inadequate responses are scored 0. The adequacy score, also known as 3DE, is determined by the number of indicators that meet a predetermined threshold (see tab. 2 in Malapit et al., 2019, for more information). If the adequacy score is 75% or higher (3DE $\geq$ .75), the participant is deemed "empowered" as he or she met the threshold for at least nine out of 12 indicators. On the contrary, if the adequacy score falls below 75% (3DE < .75), the participant is deemed "disempowered" as she or he was inadequate in four or more indicators. The GPI is only calculated for DHHs by measuring and then comparing the relative empowerment scores of men and women in the same household (Malapit et al., 2019). Both 3DE and GPI scores range from 0 to 1, where higher values reflect greater empowerment and gender parity, respectively.

2.2 | Analytical framework: Intersectional gender analysis

The pro-WEAI score is decomposable thus allowing researchers to disaggregate the 3DE achievements by indicators to recognize the areas of empowerment contributing the most to food security. Building on Morgan et al.'s (2016) conceptual gender framework, we grouped disaggregated indicators of the 3DE into four domains: decision making, household labor sharing, resource access, and norms and beliefs (see Table 1).

An intersectional gender analysis framework was applied to direct the analysis and interpret the results. According to Morgan et al. (2016), gender analysis is the process of analyzing gender

TABLE 1 Grouping pro-WEAI indicators guided by gender analysis framework.

What constitutes gendered power relations		3DE indicators
Access and resources: Who has what?	Access to resources (education, information, skills, income, employment, services, benefits, time, space, social capital, etc.)	• Ownership of land and other assets • Group membership • Membership in influential groups • Self-efficacy
Labor-sharing: Who does what?	Division of labor within and beyond the household and everyday practices	• Work balance
Social norms and beliefs: How are values defined?	Social norms, ideologies, beliefs, and perceptions	• Visiting important locations • Respect among household members • Attitudes about intimate partner violence against women
Decision-making and autonomy: Who decides?	Rules and decision-making (both formal and informal)	• Input in productive decisions • Control over use of income • Access to and decisions on financial services • Autonomy in income

Source: Morgan et al., 2016.

as a power relation and driver of inequality resulting in different experiences and needs. Adding an intersectionality lens to the gender analysis framework uses gender as a critical social stratifier and an entry point into a deeper intersectional analysis in relation to other social stratifiers, such as class, race, education, and ethnicity (Bottorff et al., 2011; Hankivsky, 2012; WHO, 2020b).

Intersectionality, a critical theoretical framework that focuses on describing unequal health experiences, has received increased attention in quantitative research (Bauer et al., 2021; Bowleg, 2012). The intersectionality approach helps researchers describe and analyze how the experiences of those at an intersection of different sociodemographic identities or positions are shaped by social power in structural and interpersonal contexts (Collins, 1990; Crenshaw, 1989). It emphasizes that those experiences may not be accurately described by studying each social identity or position separately; thus, their combined effect should be investigated (Bowleg, 2008; Hancock, 2007; McCall, 2005).

2.3 | Context and data

The study employed a secondary data analysis and presented results from the NutriFish project. The NutriFish data employed in our study were collected between January and February 2020 at six fishing villages on the shores of Lakes Victoria and Albert. Not all fish-landing sites handle underutilized small fish in Uganda, so for the purpose of the NutriFish project, these fishing villages were purposively selected as the most important sites in terms of the volume of underutilized small fish catch for implementing the project's activities.

The main livelihoods of the participants in selected fishing villages are fishing-related occupations (e.g., fishing, processing, and marketing). Other groups of people with a variety of non-fishing occupations (e.g., farming and business) reside in the same villages or, at most, within 50 km of the lake shores.

Because the fishing communities are transitory by nature, a national census would not provide an accurate picture of the number of households and other demographic parameters; people are constantly moving in and out of these fishing villages. To accommodate this feature of the study population, in each fishing village, household listing preceded the survey to identify DHHs and FHHs. The main occupation of household adults was also recorded. Target sample sizes represented both fishing and non-fishing groups, thereby ensuring that, in half of the selected households, at least one adult was involved in the small-scale fisheries value chain. The targeted number of households for each group was then randomly selected from the corresponding list.

Akin to Alkire et al.'s (2013) research design, NutriFish aimed for a total of $N = 350$ households ($N = 700$ individuals) including at least 60 DHHs and five FHHs from each of the six selected fishing villages. A total of $n = 391$ DHHs and $n = 23$ FHHs participated in the study, which equated to $N = 414$ households mapped into five districts: Buliisa, Hoima, Pakwach, Buikwe, and Masaka.

The Makerere University in Kampala, Uganda, implemented data collection for the NutriFish project. The quantitative household survey included the pro-WEAI questionnaire, the main modules, and additional Nutrition and Health modules. In addition, complementary questions addressed individual food security status, access to reliable sanitation, marriage and fertility agency, and sexual hostility (complete questionnaires are in Appendices S1 and S2).

Makerere University conducted enumerators' training in November 2019. Eighteen enumerators (nine male and nine female) were involved. They were mostly young professionals in their mid-20s and early 30s who were fluent in English and the relevant local languages. Following enumerator training, a field pre-testing exercise was conducted at Katosi fishing village on the shores of Lake Victoria, located in Mukono District. This involved practicing the procedures and administration of the pro-WEAI tool in DHHs and FHHs.

Electronic data were captured from the survey questionnaire by using the *Open Data Kit (ODK) Computer-Aided Personal Interview (CAPI)* software platform on Android tablets. Data were uploaded onto a server, downloaded, and transformed into STATA-compatible datasets and further checked for inconsistencies and errors and prepared for analysis.

2.4 | Analytical approach

Men and women in each household separately completed the *Household Food Insecurity Access Scale* (HFIAS), the primary outcome measure. HFIAS comprises nine questions to assess the "access" dimension of food security (Coates et al., 2007; see also Appendix S2, p. 7). The respondents were asked whether each situation occurred for themselves or their households.[1] Thus, the responses might not merely reflect the actual individual food security status, nonetheless, the perception of each respondent from the overall food security status of the household. Consequently, there might be different food security statuses for men and women in the same household, which were considered as the individual perception of primary male or female decision makers in the same household[2] on food security and are referred to as individual food security throughout this paper.

Built on NutriFish's overarching goal (IDRC, 2024), and guided by the intersectional gender analysis framework, we employed a comparative analytical approach among men and women disaggregated by occupation.[3] Fishing and non-fishing groups experience different challenges and opportunities. To accommodate this, the occupation variable was categorized into fishing and non-fishing groups and used as a proxy to understand the context-specific differences addressed in the study. This approach allowed us to consider the diversity and complexity of gender norms and values in each context that affected the challenges and privileges of each occupational group.

The intersectional gender analysis was conducted in three steps. First, we conducted a descriptive analysis of the studied population to provide an overall picture of respondents' food security and empowerment status. This information was used to develop the analysis plan for the first research objective.

Second, building on both the planned interventions to empower women in the NutriFish project, and the descriptive results drawn from the first step, two main conditions were identified to address the study's first objective: (a) When only a male adult was empowered (M-EMP), successful interventions to empower women could lead to a "both empowered" status (2-EMP). (b) When both male and female adults were disempowered (0-EMP), women's empowerment

[1]During the last 12 months, was there a time when *you or any household members* [Situation]? time when [Situation]?
[2]In the NutriFish project, data were collected from the primary male and female decision makers within the household unit, self-identified predominantly as husband and wife.
[3]A binary variable was generated for occupation (fishing vs. non-fishing). The fishing category included fishing, fish processing, fish trading, and casual work in fisheries. The non-fishing category included wage employer, farmer, business, student, household work, and casual work.

could result in "only woman is empowered" status (W-EMP). We hypothesized that depending on men's empowerment status in the household, the relationship between women's empowerment and food security could differ in each combination of intrahousehold patterns of empowerment (M-EMP, 0-EMP, W-EMP, and 2-EMP).

To evaluate changes in the relationship between each intrahousehold empowerment pattern and food security, we computed marginal effects (MEs) (Long & Freese, 2014) from binary logit models that included interactions between men's and women's empowerment, stratified by gender and occupation (fishing vs. non-fishing). MEs show how much the food security outcome changes for a change in one focal independent variable while holding other control variables at specific values. For example, MEs for a binary independent variable like women's empowerment display the differences in the predicted probability (Pr) of food security with a change between empowered (=1) and disempowered (=0) status, holding other control variables at specific values such as average marginal effect (AME).[4] In this example, one Pr_1 is computed for empowered status and another Pr_0 for disempowered status. The difference between these two predicted probabilities ($Pr_1 - Pr_0$) is referred to as MEs (for further details, see Long & Freese, 2014).

Four Pr(s) were computed instead of two when the independent variable was an interaction term. For example, as described in the previous paragraph, by interacting two binary variables of men's empowerment (0 and 1) and women's empowerment (0 and 1), four statuses were created: 2-EMP (1 and 1), M-EMP (1 and 0), W-EMP (0 and 1), and 0-EMP (0 and 0). The significance of interaction terms was tested through a difference-in-difference approach (diff-in-diff) (Mize, 2019) to determine whether a moderating effect existed across different intrahousehold empowerment patterns. The intent was to test the differences in Pr of food security (MEs) between the two conditions, referred to as the first differences (1st diff):

1. Pr (food security|2-EMP) − Pr (food security|M-EMP) = ME_1
2. Pr (food security|W-EMP) − Pr (food security|0-EMP) = ME_2

We tested whether the effect of each empowerment pattern varied across the two conditions referred to as the second difference (2nd diff: $ME_1 - ME_2$). This analytical approach examined associations rather than established causality. We applied it to each gender category in three groups: total sample, fishing, and non-fishing.

Regarding the third step, the second research objective was guided by the gender analysis framework. To examine the association between the pro-WEAI indicators and food security, we calculated separate binary logit regressions on each of the four power relation domains shown in Table 1. A model of the association between GPI and food security was also estimated. The analysis aimed to identify the empowerment indicators in each power relation domain associated with men's and women's food security outcomes.

In all models of Objectives 1 and 2, we controlled for the individual-level (age and education) and household-level (household size) characteristics, stratified by gender and occupation, and clustering standard errors at the level of fishing villages. Whereas we acknowledge that gender is not binary, data for this study were collected considering the dominant sociocultural norms in Uganda. In this context, gender is typically recognized as the biological sex and a

[4]AMEs represent an effect on average across the sample, which is the average (mean) of the marginal effects calculated for each observation in the sample; for further details, see Mize (2019).

binary characteristic identified as woman or man and their contextual relationships.[5] We thus coded gender as a binary variable. *Stata* (version 17) was used to conduct the analysis.[6]

3 | RESULTS

After removing subjects where observations were missing, the final sample frame comprised $N = 381$ DHHs or 762 individuals. Tables 2 and 3 and Figure 1 present the results of the descriptive analysis in step one of analytical strategy. Table 2 summarizes the prevalence of food security and food insecurity between and among different groups of men and women against different demographic variables. As shown, 37.3% of women and 26.5% of men were food secure. In the total population, 26.2% of women were empowered compared with 54% of men.

For household-level variables, when comparing women and men, the prevalence of food security significantly differed only in the Kikondo village or the district of Buikwe. There were significant differences between food secure and food insecure women (columns) among all villages and districts; the same trend existed for men thereby providing insights into context differences (by occupation) in experiencing food insecurity.

Figure 1a compares the 3DE score and contributors to disempowerment between and among men and women. The average 3DE score was below .75 for women in all groups with the non-fishing group having the lowest score (3DE = .55). Men's 3DE score met the empowerment score (3DE ≥ .75) in all groups. The orange section in the figure indicates the disempowerment score for each category (1-3DE).

Figure 1b illustrates the contribution of each of the 12 indicators to disempowerment thus helping to identify potential areas for empowering both men and women. Work imbalance was among the top-three contributors in all groups. Lack of respect among household members was another major contributor for women compared with not being a member in influential groups for men.

Table 3 compares the adequacy and empowerment scores of couples within each household. As presented in the first three rows, in most households, men had higher adequacy scores than women across all groups. For example, among the total population, more than two thirds (65.5%) of households had a greater number of adequate indicators for men than women. In one fifth (21.5%) of households, women achieved a higher adequacy score in more indicators than men, while only in 13% of households did both men and women achieve an equal rate of adequacy.

In relation to the distribution of power within households, in all groups, there were more households where only men were empowered or neither men nor women achieved the minimum empowerment score. This result implies that a higher number of men attained the empowerment score of 3DE ≥ .75 than women in the same household. The percentage of households achieving gender parity in all groups was almost similar (around 40%) with the highest average empowerment gap among the non-fishing group.

[5]In the NutriFish project, data were collected from the primary male and female decision makers within the household unit, self-identified predominantly as husband and wife. Therefore, the term gender is mainly attributed to as "gender expression" (or "gender roles") but not "gender identity."

[6]Standard Stata do-files were used to calculate the pro-WEAI score available on the International Food Policy and Research Institute (IFPRI)'s website and modified as needed to suit the NutriFish baseline data.

TABLE 2 Prevalence of food security between and among men and women against different demographic variables (intersectional gender-disaggregated analysis).

	Women ($n = 381$)			Men ($n = 381$)		
Characteristics	**Total**	**FS**	**FI**	**Total**	**FS**	**FI**
Number of observations, *n* (%)	381 (50)	142 (37.3)***	239 (62.7)	381 (50)	101 (26.5)***	280 (73.5)
Individual level[a]						
Empowerment status (% empowered)	100 (26.2)***	51 (51)***	49 (49)	206 (54)	61 (29.6)	145 (70.4)
Age (in years), %						
15–25	103 (27)***	46 (44.7)	57 (55.3)	32 (8.4)	8 (25)	24 (75)
26–45	225 (59)	76 (33.8)	149 (66.2)	250 (65.6)	68 (27)	182 (73)
>45	53 (14)	20 (37.8)	33 (62.2)	99 (26)	25 (25)	74 (75)
Education (% high education)[b]	101 (26.5)***	54 (53.5)***	47 (46.5)	139 (36.5)	46 (33)**	93 (67)
Occupation (% fishing)[c]	201 (52.8)***	70 (34.8)	131 (65.2)	261 (68.5)	63 (24.1)	198 (75.9)
Household level[d]						
Household size, mean (SD)	6.1 (0.1)	5.3 (0.2)***	6.7 (0.2)		5.5 (0.3)**	6.4 (0.2)
District, %						
Buikwe	117 (30.7)	60 (51.3)***	57 (48.7)		41 (35)***	76 (65)
Masaka	58 (15.2)	27 (46.5)	31 (53.5)		15 (25.9)	43 (74.1)
Bulisa	71 (18.6)	10 (14.1)	61 (85.9)		9 (12.7)	62 (87.3)
Hoima	70 (18.4)	28 (40)	42 (60)		23 (32.9)	47 (67.1)
Pakwach	65 (17.1)	17 (26.2)	48 (73.8)		13 (20)	52 (80)
Fishing villages, %						
Kikondo	74 (19.4)	33 (44.6)***	41 (55.4)		17 (23)***	57 (77)
Lambu	58 (15.2)	27 (46.5)	31 (53.5)		15 (26)	43 (74)
Kiyindi	43 (11.3)	27 (62.8)	16 (37.2)		24 (55.8)	19 (44.2)
Wanseko	71 (18.6)	10 (14.1)	61 (85.9)		9 (12.7)	62 (87.3)
Kaiso Tonya	70 (18.4)	28 (40)	42 (60)		23 (32.9)	47 (67.1)
Dei	65 (17.1)	17 (26)	48 (74)		13 (20)	52 (80)

Note: Values are means (SDs) or frequencies (%). Chi-square and independent Student's *t* tests were used to evaluate the distributions between and among men and women.

Abbreviations: FI, food insecurity: A food secure individual experiences none of the food insecurity conditions, or just experiences worry, but rarely in preceding 4 weeks; otherwise, the person is food insecure; FS, food security.

[a]For individual variables, between differences were indicated in the first total column and among differences in the FS column. *Between differences* refer to the significance of the difference between men and women regarding a specific variable. *Among differences* refer to the significance of the differences between FS and FI groups among women or men. For example, regarding empowerment status, there is a significant difference between men and women at $p < .01$, which is indicated in the total column. Additionally, there is a significant difference (among differences) between FS and FI women ($p < .01$), which is indicated in the FS column. However, there is no significant difference among FS and FI men.

[b]Low education: No formal education and primary; high education: secondary and tertiary.

[c]Binary variable: Fishing versus non-fishing; fishing category includes fishing, fish processing, fish trading, and causal work in fisheries.

[d]Total values at the household level are the same for men and women and were reported in the women's column.

**$p < .05$, and ***$p < .01$.

TABLE 3 Intrahousehold patterns of empowerment by occupation (%).

Intrahousehold empowerment patterns	Total ($n = 762$)	Fishing ($n = 462$)	Non-fishing ($n = 300$)
Man adequacy score > Woman adequacy score[a]	65.5	63	68
Woman adequacy score > Man adequacy score	21.5	22	21
Woman adequacy score = Man adequacy score	13	15	11
Only man is empowered[b]	39	39	39
Only woman is empowered	11.5	12.5	10.5
Both man and woman are empowered	15	14.5	15
Neither man nor woman are empowered	34.5	34	35.5
Households achieved gender parity[c]	40	42	41
Average empowerment gap[d]	0.37	0.32	0.42

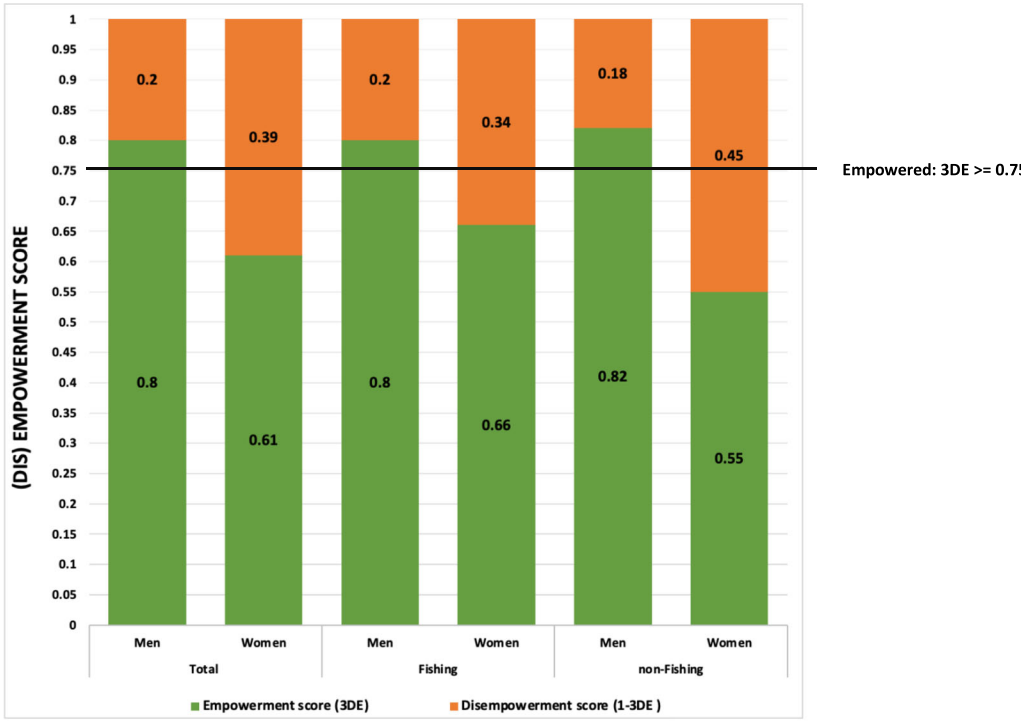
[a]An individual receives adequacy on a given indicator if that indicator meets a certain threshold. The first three rows compare the number of adequate indicators between men and women within the household.
[b]Empowered if is adequate in 9 out of the 12 indicators (3DE ≥ 75%). The 3DE score ranges from 0 to 1, where higher values reflect greater empowerment.
[c]A household achieves gender parity if either the woman is empowered, or her score is greater than or equal to the empowerment (3DE) score of the male decision-maker in her household. GPI score ranges from 0 to 1, where higher values reflect greater gender parity.
[d]The extent of the disparity between women's and men's inadequacy scores in households that lack gender parity is captured through an empowerment gap.

Table 4 and Figure S1 illustrate the differences in the probability of food security at the intersection of intrahousehold empowerment patterns, gender, and occupation. In the total population, the test of the first differences for women showed that moving from 0-EMP to W-EMP status was associated with an increase in their predicted probability of food security by 17 percentage points (Pr = .29 vs. Pr = .46, $p < .01$). Likewise, 2-EMP status compared with M-EMP was related to a .18 improvement in the predicted probability of food security (Pr = .54 vs. Pr = .36, $p < .05$).

The test of the second difference for women showed no significant difference between the two conditions. This result suggests women's empowerment in either condition was significantly associated with a higher probability of food security for women despite men's empowerment. Men had a significantly higher predicted probability of food security when only their female partner was empowered (W-EMP) compared with the situation where neither of them was empowered (0-EMP) (Pr = .20 vs. Pr = .30, $p < .01$). M-EMP and 2-EMP statuses were not associated with the predicted probability of food security status of men (Pr = .30 vs. Pr = .29, p = ns). The test of the second difference did not exhibit a significant difference between the two different conditions (2nd diff = −.11). In effect, women's empowerment was associated with an increase in the predicted probability of men's food security when only the woman was empowered despite the man's disempowerment status.

Among the fishing group, the 2-EMP pattern was related to an improvement in the predicted probability of women's food security status, which was significantly different from the M-EMP pattern (1st diff = .24; $p < .01$). The second condition did not significantly change the predicted probability of women's food security (1st diff = .03, p = ns). The test of the second difference showed that in Condition 1, the predicted probability of women's food security

(a) Empowerment score (3DE) between and among men and women.



(b) Contributors to disempowerment (1-3DE) by occupation.

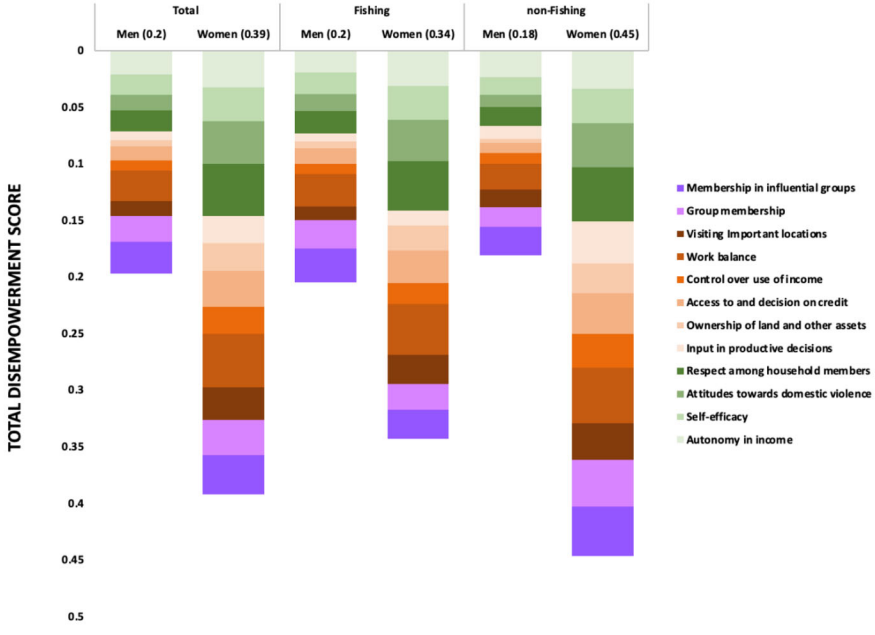


FIGURE 1 Legend on next page.

FIGURE 1 (a) Empowerment score (3DE) between and among men and women. The 3DE measures the degree to which respondents are empowered, mapped into 12 indicators. The average of the 3DE score is below the empowerment adequacy for women in all groups with the non-fishing group having the lowest score (3DE = .55). The 3DE score of men meets the adequacy score. (b) Contributors to disempowerment (1-3DE) by occupation. The contribution of each indicator to disempowerment (1-3DE) is illustrated in (b). Work imbalance is among the top three contributors in all groups with a lack of respect among household members as another major contributor for women compared with not being a member in influential groups for men.

significantly differed from Condition 2 by .21 ($p < .01$). On the contrary, women's empowerment was not significantly associated with the predicted probability of men's food security, whether men were empowered or not. This result indicates the importance of empowering both men and women in fishing communities to ensure food security for women while also exploring other strategies for men.

In contrast to women in the fishing group, non-fishing women had the highest probability of food security by 33 percentage points when only themselves (women) were empowered (W-EMP) (Pr = .60 vs. Pr = .28, $p < .01$). In the case of non-fishing men, their predicted probability of food security improved in the W-EMP pattern compared with 0-EMP (1st diff = .23, $p < .05$). This result suggests that empowering women in these households is beneficial for men's food security status compared with the situation where neither is empowered. The other condition did not change their food security (1st diff = −.01, p = ns; 2nd diff = −.24, p = ns).

Table 5 contains the results of the analysis for objective two, which used the gender analysis framework to investigate the relationship between the pro-WEAI indicators and food security. In the total population of women, attitudes about not justifying domestic violence, having respect among household members, and having control over the use of income were associated with an increase in the probability of food security (all $p < .01$). A lack of gender parity was related to a .08 decrease in the predicted probability of food security ($p < .05$). Among men in the total population, attitudes about not justifying domestic violence, and having respect among household members, in addition to having self-efficacy and group membership, were associated with a higher probability of food security status (all $p < .01$). Membership in influential groups was related to a .16 decrease in the predicted probability of food security ($p < .01$).

In the fishing group, having both respect among household members and group membership were associated with a .24 ($p < .01$) and .25 ($p < .05$) increase in the probability of women's food security status, respectively. Lack of household gender parity was related to a .15 lower probability of women's food security ($p < .01$). Among their male counterparts, having self-efficacy (.13), group membership (.17) (both $p < .01$), attitudes about not justifying domestic violence (.12), and respect among household members (.10) (both $p < .05$) were significant predictors of food security. Being a member of an influential group was related to 18 percentage points decrease in the probability of men's food security ($p < .01$).

Finally, in the non-fishing group, attitudes about not justifying domestic violence (.10), having respect among household members (.17), and ownership of land and other assets (.16) were associated with a higher probability of food security among women ($p < .01$). For men, only higher input in productive decisions was related to 17 percentage points contribution to probability of their food security status ($p < .01$).

TABLE 4 Probability of food security by intrahousehold empowerment patterns with test of interaction effect (difference-in-difference) among fishing and non-fishing groups.

	Total			Fishing			Non-fishing		
	Pr (FS)[a]	1st diff[b]	2nd diff[c]	Pr (FS)	1st diff	2nd diff	Pr (FS)	1st diff	2nd diff
Panel A: Women									
Condition 1: M-EMP → 2-EMP									
Both empowered (2-EMP)	.54 (.1)	.18** (.08)	.001 (.08)	.53 (.1)	.24*** (.09)	.21*** (.08)	.51 (.1)	.07 (.1)	−.26 (.17)
Only man is empowered (M-EMP)	.36 (.06)			.30 (.06)			.44 (.06)		
Condition 2: 0-EMP → W-EMP									
Only woman is empowered (W-EMP)	.46 (.06)	.17*** (.04)		.33 (.09)	.03 (.1)		.60 (.09)	.33*** (.08)	
Both disempowered (0-EMP)	.29 (.06)			.31 (.1)			.28 (.08)		
Panel B: Men									
Condition 1: M-EMP → 2-EMP									
Both empowered (2-EMP)	.29 (.1)	−.005 (.1)	−.11 (.12)	.29 (.1)	.01 (.09)	−.02 (.1)	.32 (.1)	−.01 (.1)	−.24 (.2)
Only man is empowered (M-EMP)	.30 (.06)			.28 (.07)			.33 (.07)		
Condition 2: 0-EMP → W-EMP									
Only woman is empowered (W-EMP)	.30 (.06)	.10*** (.04)		.22 (.04)	.04 (.07)		.47 (.1)	.23** (.1)	
Both disempowered (0-EMP)	.20 (.04)			.19 (.04)			.24 (.08)		

Note: All models were estimated using binary logit regression adjusted for age, education, occupation (only total estimations), and household size. Because of rounding, the differences do not always equal the discrete change coefficient in one pattern minus the discrete change coefficient in another pattern, similar for the second differences.

[a]Pr (FS): Predicated probability of food security. Marginal effects reported and robust standard errors in parentheses were clustered by fishing villages.

[b]Statistics for first difference (1st diff) is the difference in the effect for each specific condition.

[c]The second differences (2nd diff) column reports whether the effect of each empowerment pattern varies across the two conditions.

**$p < .05$, and ***$p < .01$.

TABLE 5 Adjusted individual gender models in fishing and non-fishing groups.

	Total		Fishing		Non-fishing	
Variables	**Women**	**Men**	**Women**	**Men**	**Women**	**Men**
Model 1: Access to resources						
Ownership of land and other assets	.02 (.07)	−.02 (.11)	−.13 (.11)	−.07 (.15)	.16 (.06)***	.16 (.14)
Self-efficacy	.08 (.05)	.14 (.02)***	.11 (.06)	.13 (.04)***	.01 (.04)	.13 (.11)
Group membership	.10 (.08)	.13 (.04)***	.25 (.11)**	.17 (.05)***	−.09 (.23)	−.02 (.13)
Membership in influential groups	−.05 (.08)	−.16 (.06)***	−.18 (.12)	−.18 (.07)***	.10 (.19)	−.09 (.09)
Model 2: Labor-sharing						
Work balance	.03 (.04)	.01 (.06)	.03 (.04)	.08 (.04)*	.04 (.08)	−.11 (.16)
Model 3: Social norms and beliefs						
Attitudes about domestic violence	.12 (.02)***	.14 (.05)***	.10 (.06)	.12 (.06)**	.10 (.03)***	.18 (.12)
Respect among household members	.20 (.04)***	.13 (.02)***	.24 (.07)***	.10 (.05)**	.17 (.06)***	.18 (.11)
Visiting important locations	−.02 (.06)	.03 (.05)	−.06 (.08)	.06 (.06)	.01 (.06)	−.01 (.09)
Model 4: Decision-making and autonomy						
Control over use of income	.10 (.04)***	−.02 (.05)	.14 (.09)	−.02 (.08)	.05 (.09)	−.02 (.06)
Autonomy in income	−.03 (.05)	.03 (.06)	−.01 (.07)	.07 (.05)	−.08 (.09)	−.02 (.09)
Input in productive decision	.03 (.06)	.02 (.05)	−.02 (.11)	−.09 (.08)	.09 (.06)	.17 (.05)***
Access to and decisions on credit	.01 (.07)	.01 (.03)	−.02 (.10)	.004 (.03)	.04 (.06)	.00 (.09)
Model 5: Household gender parity						
Lack of gender parity	−.08 (.04)**	.02 (.04)	−.15 (.05)***	.04 (.04)	.01 (.04)	.02 (.11)

Note: All models were estimated using binary logit regression adjusted for age, education, occupation (only total estimations), age, and household size. Marginal effects reported, and robust standard errors in parentheses were clustered by fishing villages.

*$p < .1$, **$p < .05$, and ***$p < .01$.

4 | DISCUSSION

We applied a comparative approach to data on pro-WEAI from six Ugandan fishing villages. Using the aggregated empowerment score, a diff-in-diff approach was employed to unpack the associations between intrahousehold empowerment patterns and food security by gender and occupation. In doing so, insights were gained into the role of couples' empowerment status on each other's food security.

As expected, there were substantial differences between men and women, varying by context in two fishing and non-fishing groups. Considering that, compared with women, men were more empowered but significantly experienced higher rates of food insecurity than women, it will be necessary to (a) find effective solutions for enhancing the food security status of disadvantaged groups of men and (b) examine the role of empowering their female counterparts in their food security status. Most previous studies focused on women's empowerment and food security generally overlooked the data on the men's side (Aziz et al., 2021; Bain et al., 2020; Galiè et al., 2019; Murugani & Thamaga-Chitja, 2019; Tsiboe et al., 2018). Even in the presence of gender-disaggregated data such as WEAI surveys, these same studies reported women's empowerment role in desired outcomes targeting households or women.

Results herein showed the importance of generating gender-sensitive analysis to underline the differences between men and women in the same household, where they have a similar situation but experience different challenges and advantages or might simply have different perceptions that lead to different answers to the same questions, such as food security. Additionally, results showed that even for women, it is crucial to pay more attention to the pattern of empowerment in their household and the role of their partner's empowerment in their food security status in different contexts. Results varying by context were also reported in a cross-country analysis of aggregated women's empowerment and gender equality in Asia and Africa (Quisumbing et al., 2021). It is apparent that accounting for context-specific heterogeneity in empowerment and unequal gender relations is crucial to capturing cross-cultural variations in gender power relations and related constraints and opportunities (Akter et al., 2017; Mason & Smith, 2003).

Considering gender and fisheries, the scholarly literature pointed to the significance of women's roles in African fisheries. Despite their fundamental role in fishing activities for survival and livelihood, women suffered from various obstacles, such as unrecognized contributions, being excluded from fisher organizations, and receiving little training (e.g., marketing opportunities) (Kaminski et al., 2020; Lentisco & Lee, 2015; Ragsdale et al., 2022; Smith, 2022). We propose that empowering women and their inclusion in the decision-making process at all nodes of the fishing value chain is integral to developing sustainable food security strategies in Uganda. Gender-sensitive data and methodologies, such as data collected through the pro-WEAI questionnaire, can help identify gendered barriers in Ugandan small-scale fisheries.

The second study objective was motivated by the need to identify which dimensions of empowerment were related to individual food security experiences. Previous studies have suggested that in analyzing the subdomain of empowerment, scholars should not rely only on top contributors to disempowerment (Carlson et al., 2015; Quisumbing et al., 2021; Santoso et al., 2019). Given the complex and context-specific nature of empowerment, it is imperative to lay it out as much as possible to discover the tiers of gender inequality resulting from uneven power relations. Mapping out the 12 indicators of empowerment, guided by an established gender framework, presented more significant associations thus confirming the ongoing discussion in the literature about the existence of trade-offs among different empowerment dimensions

(Quisumbing et al., 2021; Tsiboe et al., 2018). The emergence of a more subtle pattern of associations in each model in our study raised more questions than answers, however.

To elaborate, associations between indicators in the social norms and beliefs category (Model 3) and food security were more apparent compared with other groups. These results were consistent with the qualitative component of the NutriFish project (Ankunda & Nanyonjo, 2023). The NutriFish field researchers collected data through focus groups and key informant interviews. Pro-WEAI qualitative findings revealed high conflicts between couples. For example, focus groups showed that most men preferred marrying disempowered women for fear of being disrespected and controlled by an empowered woman. Women were similarly reluctant to marry high-empowered men owing to their rights being undermined and not being respected. The field report affirmed that lack of trust and balance in intrahousehold power relations resulted in increased domestic violence, which indicated a negative association with better food security among fishing men and non-fishing women in our results (Ankunda & Nanyonjo, 2023).

These findings call for interventions to develop behavior change communications at the household level. Gendered-focused interventions can foster a supportive household environment and more balanced intrahousehold power relationships (Ridolfi et al., 2019). Previous studies have demonstrated the success of gender transformative approaches (GTAs) in identifying potential opportunities for change starting from the household (e.g., Galiè & Kantor, 2016). GTAs strive to enhance the position of women, challenge the unequal distribution of resources and allocation of duties between men and women, and address power imbalances between women and others in the community (Rottach et al., 2010). Through fostering critical awareness among both men and women regarding gender roles and norms prevalent in society, GTAs acknowledge that gender is a socially constructed concept and that men and women behave based on predefined roles and expectations (Njuki et al., 2016; Risman, 2004).

Our results also suggested that the first step to balancing unequal power relations in the household and reducing the empowerment gap might be to target the root causes of disempowerment and, consequently, food insecurity. Transforming men's and women's perceptions toward their roles and capabilities, how they should interact with each other, and what is appropriate in their everyday life can greatly affect the creation of equitable gendered power relations in the household and community (Galiè & Kantor, 2016).

Concerning other domains, no improvement was shown in men's food security status in our study despite their empowerment status in the fishing group. Still, they showed the greatest number of significant associations between empowerment indicators and food security. This result may once more confirm the importance of individual gender-sensitive analysis, as results affirmed that women's empowerment did not contribute to men's food security status. Perhaps investing in men's empowerment through different indicators, namely, self-efficacy, group membership, and work balance, has the potential to enhance their food security. Fishing women's food security also benefited from men's empowerment besides having household gender parity. Taken together, these results confirmed the importance of intrahousehold gender dynamics in empowering both men and women resulting in better food security in the fishing group.

Fewer robust relationships among men and women in non-fishing group (compared with their fishing counterparts) could be attributed to more heterogeneity in this group, which comprised various occupations, including farming, business, and housework. Results also showed that non-fishing women were the only group exhibiting a positive relationship between land and asset ownership and food security. This fact may reflect their involvement in land-based activities, such as small-scale farming, and the importance of women's asset ownership in

achieving food security (Doss, Meinzen-Dick, & Bomuhangi, 2014; Doss, Summerfield, & Tsikata, 2014).

Although work imbalance was one of the top contributors to disempowerment in all groups, it was not necessarily correlated with better food security except among fishing men, which tended to be significant. One possible explanation is that some socioeconomic characteristics were not captured during data collection (e.g., income, district of origin, and ethnicity). This research-design decision could have limited capturing the moderating impact of other determinants in the subsequent analysis and interpretation phases, determinants that influence not only work imbalance but other indicators.

4.1 | Study limitations

The generalizability of the results is subject to certain limitations. First, further research will allow for the application of our context-specific results to other populations, owing to the context-specific nature of gender and food systems. Second, assessing gender power relations, using either quantitative or qualitative methodologies, involves various challenges, such as the social desirability of respondents, and recall or other internal biases (Garrison-Desany et al., 2021; Shuib et al., 2013). Consequently, nuances and other aspects of gender dynamics may not have been captured in the available secondary dataset, which could limit some of the interpretations of our results.

Third, the analysis was limited to available data on DHHs. Different studies have shown higher vulnerability for FHHs and various challenges related to gender and sociocultural norms. Thus, studying FHHs' specific hardships in the nexus of gender, empowerment, and food security could provide more insights into the complexity of gender power relations in the studied context. Fourth, this study was based on secondary and cross-sectional survey data, which may not capture unobserved dynamics of food security and empowerment. Furthermore, cross-sectional studies have certain limitations themselves. For instance, they cannot establish a cause-and-effect relationship nor analyze outcome patterns over time. Considerably more empirical work is needed to assess the causal relationships in this pathway.

Finally, in the NutriFish project, HFIAS was used to evaluate the food security status of men and women, while the unit of analysis was at both individual and household levels. While differing responses from male and female members of the same household could indicate individual experiences of food insecurity, other factors could be at play. Despite living in the same household, different food insecurity statuses among men and women may reflect different individual perceptions of household food insecurity experiences. This, in turn, could reflect each person's experience of varying levels of severity. Another possible explanation could be the lack of information about the household composition of male respondents in the pro-WEAI data. In Ugandan fishing villages, polygamous households are common, and men may not spend the whole year with the same household included in the questionnaire. As a result, their experience of food insecurity could be based more on their individual experience rather than household status (Barak, 2023).

Furthermore, it is increasingly evident that unequal distribution of food resources within households is a significant cause of gender inequalities in nutrition (Ghatak et al., 2024). Research shows that women and girls often consume lower quantities or lower-quality food than their male counterparts. One mechanism contributing to this gender-inequitable food allocation is women eating after men with this gendered food-allocation practice significantly

linked to other gender-discriminatory attitudes and practices in households (Ghatak et al., 2024).

5 | STUDY CONTRIBUTIONS

The results provided several contributions to current literature. First, we conducted a gender analysis within an intersectionality framework to highlight the context-specific complexity of gender relations using pro-WEAI data. In so doing, the gendered and context-specific determinants of food insecurity were addressed prompting tailored recommendations for the studied population. Importantly, results confirmed previous research about the importance of context-specific and multi-domain approaches, namely, sociocultural determinants to accurately measure gender dynamics and empowerment phenomena (Akter et al., 2017; Galiè et al., 2019; Morgan et al., 2017; O'Hara & Clement, 2018; Seymour & Peterman, 2018).

Second, our specially designed analytical approach accounted for the moderating effect of men's and women's empowerment on their food security status and tested the differences between patterns of intrahousehold empowerment. Third, in addition to analyzing the aggregated empowerment score, we investigated the disaggregated score to underline differences between and among men and women. Previous studies have pointed out the prominence of assessing aggregated and disaggregated empowerment status in directing the interventions and policies in a way that does not cause unintended consequences and worsen existing gender inequalities (Carlson et al., 2015; Quisumbing et al., 2021; Sariyev et al., 2020; Tsiboe et al., 2018).

Finally, there has been little quantitative analysis of gender power relations on men and women's food security, particularly within the intersectionality framework. This was the first study using this approach in analyzing food security. The interpretation of the inaugural results was informed by the qualitative component of the NutriFish project. The results of the baseline pro-WEAI survey informed the development of gender transformative actions in the NutriFish project, which aimed to address underlying behaviours, social norms, practices, and power relations for achieving gender equality and women's empowerment. To bring about this transformation, the project implemented a range of activities, including conducting social and behavioral change interventions using gender transformative tools, such as theatre for development (role plays), sensitization of communities on role sharing and engaging men, facilitated group discussion sessions, and role models in respective communities (Efitre et al., 2023).

6 | CONCLUSION

Results affirmed our inaugural research-design choice to use an intersectional gender analysis approach with the pro-WEAI. Results further emphasized the significance of using context-specific and multi-domain approaches to accurately measure gender dynamics and empowerment regarding food security. The magnitude and significance of the association between the aggregated score of (a) women's empowerment and (b) the food security status of men and women changed depending on the empowerment status of men in the household. Analysis of associations between different domains of empowerment and food security, using a gender-analysis framework, also revealed different patterns between and among men and women in varying occupational groups (i.e., fishing and non-fishing).

Results further suggest that, after carefully analyzing the sociocultural context of the target population, certain domains and indicators of women's empowerment in agriculture, notably social norms and beliefs, should be given priority over others. We strongly suggest that sociocultural-informed studies should be prioritized in agricultural development interventions to create more sustainable impacts pursuant to women's empowerment and food security.

AUTHOR CONTRIBUTIONS

Farzaneh Barak designed the study conception and developed the overall research plan, analyzed data, wrote the manuscript, and had primary responsibility for the final content; Jackson Efitre and Robinson Odong adapted the pro-WEAI questionnaire to NutriFish's objectives, supervised data collection, and provided data for this study; and Hugo Melgar-Quiñonez provided guidance on the overall research plan including the project conception, the analytic design, and approach; all authors read and approved the final manuscript.

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CONFLICT OF INTEREST STATEMENT

The authors report no conflicts of interest.

ETHICAL CONSIDERATIONS

Before commencing the study, ethical clearance was sought and obtained from Makerere University and the Uganda National Council for Science and Technology (UNCST) for primary data collection by the NutriFish team. Additionally, ethical approval for secondary data analysis was obtained from McGill University, Canada (REB 21-04-041).

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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