



Gender accommodative versus transformative approaches: a comparative assessment within a post-harvest fish loss reduction intervention

Steven M. Cole, Alexander M. Kaminski, Cynthia McDougall, Alexander S. Kefi, Pamela A. Marinda, Modern Maliko & Johans Mtonga

To cite this article: Steven M. Cole, Alexander M. Kaminski, Cynthia McDougall, Alexander S. Kefi, Pamela A. Marinda, Modern Maliko & Johans Mtonga (2020) Gender accommodative versus transformative approaches: a comparative assessment within a post-harvest fish loss reduction intervention, *Gender, Technology and Development*, 24:1, 48-65, DOI: [10.1080/09718524.2020.1729480](https://doi.org/10.1080/09718524.2020.1729480)

To link to this article: <https://doi.org/10.1080/09718524.2020.1729480>



© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



Published online: 25 Mar 2020.



Submit your article to this journal [↗](#)



Article views: 592



View related articles [↗](#)



View Crossmark data [↗](#)



Gender accommodative versus transformative approaches: a comparative assessment within a post-harvest fish loss reduction intervention

Steven M. Cole^a , Alexander M. Kaminski^b , Cynthia McDougall^c ,
Alexander S. Kefi^d, Pamela A. Marinda^e , Modern Maliko^d and Johans Mtonga^f

^aInternational Institute of Tropical Agriculture, Dar es Salaam, Tanzania; ^bInstitute of Aquaculture, University of Stirling, Stirling, UK; ^cWorldFish, Penang, Malaysia; ^dMinistry of Fisheries and Livestock, Chilanga, Zambia; ^eUniversity of Zambia, Lusaka, Zambia; ^fZambia Center for Communication Programmes, Lusaka, Zambia

ABSTRACT

Technical and social constraints limit value chain actors from equitably engaging in and benefiting from capture fisheries in low-income settings. Extension and development programs often focus on the former, which reflects a technocratic orientation of the fisheries sector and uncertainty about effective ways for development programs to engage with gender and other social constraints. This study presents empirical insights that address these challenges to fisheries development. The study took place in fishing camps in the Barotse Floodplain, Zambia to compare two approaches addressing gender constraints within a broader post-harvest fish loss reduction intervention: an accommodative and a transformative approach. The former embodied a more common 'practical needs' set of strategies to ensure female participation, while the latter comprised a communication tool embedded in an action research process to build critical consciousness. Results indicate that the use of a transformative approach led to significant changes in gender equal attitudes and women's empowerment outcomes compared to only using an accommodative approach. Development programs working in fisheries can apply the findings to engage effectively with gender constraints, especially using transformative approaches to help enable women and men to overcome the social and technical barriers that constrain their lives and livelihoods.

ARTICLE HISTORY

Received 5 June 2019
Accepted 11 February 2020

KEYWORDS

Gender transformative approach; fish processing; small-scale fisheries; women's empowerment; Zambia

Introduction

Small-scale inland capture fisheries contribute significantly toward enhancing the food, nutrition, and economic security of millions of people in low-income countries (Lynch

CONTACT Steven M. Cole s.cole@cgiar.org, stevenmichaelcole@gmail.com International Institute of Tropical Agriculture, Dar es Salaam, Tanzania

© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

et al., 2017; Béné et al., 2015). Value chains, comprising networks of actors and their activities that deliver products and services, amplify the role capture fisheries (and other natural resources) play in bringing about these positive development outcomes (Bjorndal, Child, & Lem, 2014). Value chains are, however, configured by and function within broader social, political, economic, and environmental contexts that also create a number of constraints that limit the extent to which capture fisheries can achieve their full development potential (High Level Panel of Experts, 2014; Welcomme et al., 2010; Webber & Labaste, 2010).

Value chain constraints are technical in scope, such as the use of poor methods when drying fish that result in post-harvest losses and waste (Adeogun & Adeogun, 2015; Akande & Diei-Ouadi, 2010; Tesfay & Teferi, 2017). Other constraints are social in scope, including gendered power dynamics that restrict women's involvement in fishery value chains (Cole, Puskur, Rajaratnam, & Zulu, 2015; Fröcklin, de la Torre-Castro, Lindström, & Jiddawi, 2013). Gendered power dynamics affect women's decision-making capacities, for example, on the types of activities they participate in, their time and labor investments, and how they utilize their incomes (Rajaratnam, Cole, Kruijssen, Sarapura, & Longley, 2016; Cole et al., 2018). Such dynamics undermine women's empowerment and compound the technical constraints in fishery value chains, eventually reducing the impact small-scale fisheries can have on poverty alleviation and increasing food and nutrition security (Cole et al., 2015, 2018).

Extension and value chain development programs in small-scale fisheries, aquaculture, and agriculture have increasingly recognized the need to engage with the social and gender constraints that create disadvantages for women and other social groups (Farnworth, Kantor, Kruijssen, Longley, & Colverson, 2015; Kruijssen, McDougall, & van Asseldonk, 2018; Poulsen, 2016). A large number of resources have surfaced in the past decades on gender integration in these sectors (e.g., Commonwealth Secretariat, 2001; Food and Agriculture Organization of the United Nations [FAO], 2011, 2013, 2016; Poulsen, 2016). Yet valid critiques have emerged that the predominant 'business as usual' approach – often known as a gender accommodative approach – to engaging with gender in these sectors is limited, and may not contribute to substantive or lasting shifts in gender imbalances (Cole, Kantor, Sarapura, & Rajaratnam, 2014; Kantor, 2013; McDougall et al., 2015).

A gender accommodative approach recognizes gender constraints but seeks to work 'around' these constraints to engage women rather than challenging the barriers that limit women's participation in or capacities to derive benefits from value chains (Interagency Gender Working Group, 2017). Thus, the approach only engages with visible gender gaps and not with the underlying structural barriers that create gaps such as unequal attitudes, norms, and power relations (Cole et al., 2015). A gender transformative approach, similar to the accommodative approach, recognizes gender-based constraints. However, a transformative approach seeks to engage with and reduce or overcome gender-based constraints, not work around them (Interagency Gender Working Group, 2017). A transformative approach aims to do so through encouraging 'critical awareness among men and women of gender roles and norms; promote the position of women; challenge the distribution of resources and allocation of duties between men and women; and/or address the power relationships between women

and others in the community' (Rottach, Schuler, & Hardee, 2009, p. 8). In conjunction with enabling increased awareness of the constraints and how they manifest and are perpetuated within social institutions, a gender transformative approach includes opportunities for women and men to jointly identify what shifts in norms, behaviors or other barriers they would like to see, as well as provides a space to try out new ways of being (Hillenbrand, Karim, Mohanraj, & Wu, 2015; Wong, Vos, Pyburn, & Newton, 2019), or what Cornwall (2016) refers to as building a critical consciousness.¹

In the fisheries and agriculture research for development literature, there is a noticeable gap regarding how to implement gender transformative approaches, and more fundamentally, there is a lack of empirical evidence on the influence of such an approach on alleviating gender constraints (see Wong et al., 2019). This study addresses both these gaps by analyzing results from an empirical assessment of a gender accommodative versus a transformative approach in an inland capture fishery in Africa. The project on which the study draws took place in the Barotse Floodplain, Western Province, Zambia. The comparative assessment of the gender approaches was combined with research testing improved fish processing technologies with women and men value chain actors to help reduce post-harvest losses.

The research question this study explores is: How does a gender accommodative approach compare to a transformative approach in terms of influencing women's empowerment in a post-harvest fish loss reduction intervention? We draw on the definition of empowerment by van Eerdewijk et al. (2017, p. 13) for this study as 'the expansion of choice and strengthening of voice through the transformation of power relations, so women and girls have more control over their lives and futures.'

The rest of the paper is structured as follows. The next section provides background information on the study site and project and describes the two gender approaches evaluated in the study. Section three presents the framework used to guide the analysis for the study. The study methods and materials are presented in section four, followed by the results in section five. The paper ends with a discussion and conclusion section that highlights the differences found between the accommodative and transformative approaches that were evaluated and the implications of these differences for extension and development programs in and outside capture fishery settings.

Project background and scope

The Barotse Floodplain is located in the upper Zambezi catchment, where people engage in a diverse mix of fishing, farming, and livestock rearing activities (Rajaratnam et al., 2015). Fish consumption and sales provide important sources of nutrients and income. Once the rainy season ends and floods recede (in May/June), many people migrate from the uplands and settle on fishing camps in the plains. Migration signifies the start of a period of increased wealth and prosperity as fishing and related activities intensify (Turpie, Smith, Emerton, & Barnes, 1999). By December, the rains begin to flood the plains and a national fishing ban is implemented between December and February preventing any further fishing activities.

Generally, men tend to be the primary fishers, women the primary processors of fish, and a mix of women and men occupy the trading node in this value chain

(Rajaratnam et al., 2016; Turpie et al., 1999). While gendered roles in the value chain are evident, many actors participate in activities outside their primary node of operation due to necessity rather than other reasons (Kaminski et al., unpublished manuscript). For example, fishers process fish because they are trying to avoid spoilage of their unsold fresh fish when there is a lack of market or an oversupply of fish during the height of the fishing season. Conventional technologies such as open-air sun drying on reed mats are causing significant physical and quality losses (Kefi, Cole, Kaminski, Ward, & Mkandawire, 2017).

A research project on reducing post-harvest fish losses and improving gender relations in the value chain was implemented in the floodplain from 2015 to 2017 by extension officers in the Department of Fisheries and scientists from university and international agriculture research institutes. The project was implemented on six fishing camps situated in the floodplain² across three districts (Mongu, Senanga, and Nalolo). The project worked with women and men fishers, processors, and traders to develop and test improved fish processing technologies: (1) solar tent dryers; (2) fuel-efficient kilns for smoking; (3) ice; and (4) salting. Over 250 people (38% female, 62% male) indicated interest in testing the technologies. Over the course of two fishing seasons, project participants tested and modified the four technologies to meet their needs and the local context.

In conjunction with the above, the project developed and tested a gender transformative approach against a gender accommodative approach. The latter was referred to as a 'practical gender needs approach' (PGNA) (see FAO, 2014), and its use enabled project personnel to be mindful of participants' practical gender needs (e.g., their roles, responsibilities, and time constraints). The PGNA acknowledged that gendered roles, responsibilities and time commitments shape where and when certain groups of people can attend meetings and limit their access to resources. To accommodate these differences, project personnel learned how to adjust their meeting times, for instance, to ensure that women could actively participate when testing the improved fish processing technologies.

The project partnered with the Zambia Center for Communication Programmes to develop a gender transformative communication (GTC) tool, which was grounded in empowerment education and transformative learning theory (Freire, 2000; Mezirow, 2000). The tool comprised bespoke drama skits (three total) on gender-related issues in the fishery value chain and a process (guiding questions) for facilitated discussions, all consolidated into a manual. The subject matter included in each of the three skits was informed by prior social and gender analyses conducted in the floodplain (Cole et al., 2015; Rajaratnam et al., 2015; Rajaratnam et al., 2016) and similar scoping research carried out during the early stages of the project.

The manual helped facilitators and drama group members carry out the intervention in the fishing camps. The main topics covered in the skits included gender roles and responsibilities, power, support and working together, and decision-making. The skits were developed in a manner that enabled the transmission of serious and sensitive subject matter in a relatively fun and humorous way. Facilitators asked thought-provoking questions to participants for around thirty minutes after the entire skit was acted out. The first skit was carried out in July 2016, the second skit in August, and the third and final skit was carried out in September 2016.

The reflection questions that were asked by facilitators sparked general discussions at the community level about the issues surfaced by the drama skits. Some of the issues raised were on the gendered nature of value chain activities, power relations that limit people's (and especially women's) participation in certain activities or their abilities to make important decisions about when, where, or how to fish or process and trade fish in a manner that minimizes losses. After each skit and subsequent discussions at community level, Department of Fisheries officers organized project participants who had been testing and modifying the improved technologies into groups and created opportunities for them to have richer discussions, reflect critically about the salient gender issues highlighted in each skit, and formulate action plans to address the issues.

Analytical framework: multiple dimensions and levels of empowerment

van Eerdewijk et al. (2017) frame empowerment in terms of three interacting dimensions: resources, agency, and institutional structures. We translated their and other prominent framings of empowerment into measurable elements for this study, which are presented in Table 1. Rather than focusing on a narrow tracking of empowerment or any one element, the study assesses change in several interconnected dimensions: in resources (in terms of control over key value chain assets); in agency (in terms of decision making about income) and also exercising choice to participate in fishery-related livelihood opportunities (as an expression of agency); and in institutional structures (and specifically gender attitudes toward inequitable norms).

The study also assesses empowerment at multiple levels. Lombardini, Bowman, and Garwood (2017) explain that empowerment can be assessed at the personal level

Table 1. Aspects and elements of empowerment addressed in this study.

	Resources	Agency	Institutional structures
Aspects and elements of empowerment (relates to framework)	Control over resources and assets	Decision making over use of income Exercising choice (an expression of agency, see van Eerdewijk et al., 2017). Specifically, choices about involvement in livelihood activities.	Gender attitudes toward inequitable norms. Norms and attitudes are key components of institutional structures that determine women's empowerment (van Eerdewijk et al., 2017).
Adapted from/draws on framework	WEAI modified to fit the capture fisheries value chain context (see Materials and methods)	WEAI modified to fit the capture fisheries value chain context (see Materials and methods) and van Eerdewijk et al. (2017)	Gender attitudes scale (e.g., Gender Equitable Men scale, see Nanda, 2011)
Measured in this study	Changes in perception of individual versus joint ownership of key value chain assets (e.g., fishing gear)	Changes in input into household decision making about income from fishing, processing, and trading Changes in participation in value chain opportunities (fishing, processing, and trading)	Changes in gender attitudes toward inequitable norms about women's and men's involvement in capture fishery value chain activities

Note: WEAI: Women's Empowerment in Agriculture Index (Alkire et al., 2013).

(e.g., a woman's beliefs about her own worth), relational level (a woman's position relative to others), and at the environmental level (changes in formal or informal societal institutions or structures). We focus on assessing empowerment primarily at the relational level in this study. However, given our focus on gender attitudes toward inequitable norms, we are able to assess empowerment at the environmental level (see Lombardini et al., 2017, p. 6).

Materials and methods

A quasi-experimental design (White & Sabarwal, 2014) was chosen to evaluate the efficacy of the PGNA and GTC tool that were piloted. On all six camps, the PGNA was adopted at the start of the project. The GTC tool was only piloted in three out of the six fishing camps (two camps in Mongu District, one camp in Senanga District). The camps where the GTC tool was piloted were chosen to ensure that a mix of both temporary and permanent camps were included.

The women's empowerment in fisheries index (WEFI)

To create a fit-for-purpose measurement tool, the project modified the Women's Empowerment in Agriculture Index³ (WEAI, Uganda abridged version) in mid-2015 to accommodate the capture fishery value chain context. The WEAI is a survey-based index that measures the state of empowerment and gender parity in the broad agriculture sector, identifies areas where empowerment-focused interventions can be strengthened, and enables projects to track progress implementing their interventions over time. The WEAI measures the roles and extent of women's engagement in agriculture in five domains: decisions about agricultural production, access to and decision-making power over productive resources, control over use of income, leadership in the community, and time use. A gender parity index is computed from the data collected across the five domains. The index compares women's empowerment scores to men's scores within their homes.

The project's modification efforts of the WEAI produced the Women's Empowerment in Fisheries Index (WEFI). As well as adaptation to the fisheries context, the WEFI embodied three main changes to the WEAI tool: (1) exclusion of certain questions and domain sections that were not appropriate given the project focus; (2) alterations to domain sections to shorten the questionnaire and ensure it took under 45 minutes to administer with project participants; and (3) the addition of a gender attitudes scale on norms (Nanda, 2011). Attitudes about gender norms⁴ are important components of institutional structures that determine the empowerment of women (van Eerdewijk et al., 2017). In addition, women and men value chain actors were interviewed, but not their spouses. Finally, the project did not develop an index score to gauge women and men value chain actors' levels of empowerment given the significant changes made to the instrument during the modification process. The WEFI underwent pretesting in three fishing communities outside the project area and subsequent refinement before administering it at baseline.

The data collected by the WEFI and used for analysis in this study included those on women's and men's involvement in fishing, processing and trading fish and their control over the use of income generated from these activities, their ownership status of key value chain assets, and on gender attitudes. Project participants were asked whether they participated in a particular value chain activity (e.g., processing) in the past 12 months prior to administering the WEFI and how much input (no input, or small, medium, or large input) they made into decisions on the use of income generated from the activity. In this study, making 'large input' into household decisions on the use of income from fishing or trading fish implies a person has more agency. Participants were also asked about who in their household owns a certain value chain asset, specifically whether they or their spouse own it outright or they own it jointly with their spouse. The gender attitudes scale comprised eight statements that participants were asked to respond to: 'agree' = 1, 'partially agree' = 2, 'disagree' = 3. Responses to the eight statements were summed. The highest score possible was 24, indicating a perfect gender equal attitude, and the lowest score was 8, indicating a perfect gender unequal attitude. Statements reflected current gender norms in the Barotse Floodplain (see [Table 2](#)).

Table 2. Statements included in the gender attitudes scale of the WEFI.

-
1. Women should not get involved in fishing fulltime, this is a man's responsibility
 2. Women should not own canoes, fishing nets, and other means to fish
 3. Women should primarily be the ones who clean and process fish
 4. Women should primarily be the ones who trade or market fish, not men
 5. Men should primarily be the ones who transport fish to a market for sale
 6. Men should primarily be the ones who control the earnings obtained from the sale of fish
 7. Women should primarily be the ones who prepare meals (including fish) for the family or if guests come to visit
 8. Men should mostly be the ones who belong to fisheries clubs, organizations, or associations, not women
-

Note: WEFI: Women's Empowerment in Fisheries Index.

The project administered the WEFI at baseline in 2015 and early 2016 to 148 people (58 women, 90 men) before any gender-related activities started. The WEFI endline was carried out in December 2016 to the same women and men. Due to attrition, only 85 people were interviewed. While the attrition rate was high (42.6%), it is not too surprising given the complexities involved in working and conducting research in small-scale fisheries settings in sub-Saharan Africa (Witt, Pemsil, & Waibel, 2010). Attrition was mainly due to people migrating off the fishing camps to their upland villages or elsewhere to engage in other income generating activities, marrying and moving to other areas, or being unavailable to interview during the endline survey period. Of the 85 people whose baseline and endline responses were captured by the WEFI, five people from the three fishing camps where the drama skits were performed did not attend any of the skits. These five individuals (three women, two men) were excluded from the analysis to enable a strict comparison between those on camps where only the PGNA was carried out ('PGNA only,' $n = 35$) and those who participated in the drama skits ('PGNA + GTC,' $n = 45$).

Summary statistics on the data collected at baseline and endline ($N = 160$) are presented in the results section, disaggregated according to whether an individual was

from a PGNA only or PGNA + GTC camp and by sex. Tests were carried out to determine whether mean differences were statistically significant at or below the 5% confidence level. Ethical clearance to implement the research project was acquired from the University of Zambia's Humanities and Social Sciences Research Ethics Committee and permission to carry out the project in the floodplain was granted by the Barotse Royal Establishment (traditional authority governing Western Province). Informed consent was obtained prior to conducting all interviews.

Results

Table 3 presents the demographic profiles of the samples from the two sets of fishing camps. The results indicate, overall, that the samples from the two sets of camps had similar demographic profiles.

Table 4 presents the results from the analysis of the data collected using the gender attitudes scale. Mean gender equal attitude scores for the overall sample increased by 3.91 (20.9%) from baseline to endline ($p < 0.0001$). Mean gender equal attitude scores of people from both sets of camps increased from baseline to endline, yet was more than twofold for those from PGNA + GTC camps and statistically significant at the 1% confidence level. Perhaps most striking about these results is the finding from

Table 3. Demographic profiles of study participants (means or %).

Variables	PGNA only ($n = 35$)	PGNA + GTC ($n = 45$)
Sex (male = 1)	0.60 (0.50)	0.56 (0.50)
Age (years)	36.94 (13.76)	39.67 (10.21)
Education level (years)	6.38 (3.19)	7.18 (1.69)
Household size	5.66 (3.32)	5.98 (2.70)
Marital status (% married)	88.57	80.00
<i>Reason for being on fishing camp (%)</i>		
Fishing	58.82	60.00
Processing	5.88	11.12
Trading	35.30	24.44
Other reasons	0.00	4.44

Notes: PGNA: practical gender needs approach; PGNA + GTC: practical gender needs approach + gender transformative communication. Results presented for sample at baseline only ($N = 80$). Standard deviations in parentheses.

Table 4. Mean gender attitude scores.

Gender attitude scores	Baseline	Endline	p -Value
Total ($n = 77$)	18.74 (3.87)	22.6 (3.01)	<0.0001
PGNA only ($n = 32$)	19.13 (3.90)	21.1 (4.05)	0.0521
PGNA + GTC ($n = 45$)	18.47 (3.88)	23.8 (1.03)	<0.0001
Women ($n = 32$)	19.97 (3.23)	23.1 (1.90)	<0.0001
PGNA only ($n = 12$)	20.67 (2.77)	22.2 (2.33)	0.1655
PGNA + GTC ($n = 20$)	19.55 (3.47)	23.6 (1.39)	<0.0001
Men ($n = 45$)	17.87 (4.09)	22.4 (3.59)	<0.0001
PGNA only ($n = 20$)	18.20 (4.24)	20.5 (4.74)	0.0913
PGNA + GTC ($n = 25$)	17.60 (4.03)	23.9 (0.60)	<0.0001

Notes: PGNA: practical gender needs approach; PGNA + GTC: practical gender needs approach + gender transformative communication. Missing baseline values for 3 observations (PGNA only, 2 female and 1 male) and therefore dropped from the analysis. $N = 154$ (across baseline and endline samples). Sample sizes the same at baseline and endline for each sub-group. Standard deviations in parentheses.

Table 5. Levels of involvement in fishing, processing, and trading fish.

	Baseline	Endline	<i>p</i> -Value
Fished over the past 12 months (1 = yes)			
PGNA only (<i>n</i> = 35)	0.57 (0.50)	0.60 (0.50)	0.8116
PGNA + GTC (<i>n</i> = 45)	0.58 (0.50)	0.89 (0.32)	0.0007
Women who fished over the past 12 months			
PGNA only (<i>n</i> = 14)	0.14 (0.36)	0.07 (0.27)	0.5585
PGNA + GTC (<i>n</i> = 20)	0.05 (0.22)	0.75 (0.44)	<0.0001
Men who fished over the past 12 months			
PGNA only (<i>n</i> = 21)	0.86 (0.36)	0.95 (0.22)	0.3047
PGNA + GTC (<i>n</i> = 25)	1.00 (0.00)	1.00 (0.00)	...
Processed fish over the past 12 months (1 = yes)			
PGNA only (<i>n</i> = 35)	0.31 (0.47)	0.80 (0.41)	<0.0001
PGNA + GTC (<i>n</i> = 45)	0.53 (0.50)	0.91 (0.29)	<0.0001
Women who processed fish over the past 12 months			
PGNA only (<i>n</i> = 14)	0.43 (0.51)	0.71 (0.47)	0.1363
PGNA + GTC (<i>n</i> = 20)	0.55 (0.51)	0.85 (0.37)	0.0392
Men who processed fish over the past 12 months			
PGNA only (<i>n</i> = 21)	0.24 (0.44)	0.86 (0.36)	<0.0001
PGNA + GTC (<i>n</i> = 25)	0.52 (0.51)	0.96 (0.20)	0.0002
Traded fish over the past 12 months (1 = yes)			
PGNA only (<i>n</i> = 35)	0.63 (0.49)	0.91 (0.28)	0.0040
PGNA + GTC (<i>n</i> = 45)	0.60 (0.50)	0.89 (0.32)	0.0014
Women who traded fish over the past 12 months			
PGNA only (<i>n</i> = 14)	0.93 (0.27)	0.86 (0.36)	0.5585
PGNA + GTC (<i>n</i> = 20)	0.85 (0.37)	0.90 (0.31)	0.6429
Men who traded fish over the past 12 months			
PGNA only (<i>n</i> = 21)	0.43 (0.51)	0.95 (0.22)	0.0001
PGNA + GTC (<i>n</i> = 25)	0.40 (0.50)	0.88 (0.33)	0.0002

Notes: PGNA: practical gender needs approach; PGNA + GTC: practical gender needs approach + gender transformative communication. *N* = 160 (across baseline and endline samples). Sample sizes the same at baseline and endline for each sub-group. Standard deviations in parentheses.

the group of men from PGNA + GTC camps. Their scores on average increased the most compared to any other group, by 6.28 (35.7%) ($p < 0.0001$). For men in the PGNA only group, the mean change in scores from baseline to endline was 2.25 (12.4%) and was not statistically significant at or below the 5% confidence level ($p = 0.0913$).

Table 5 presents the levels of involvement (interpreted as percentages) people from the two camps had in fishing and processing and trading fish 12 months prior to administering the baseline or endline survey. For those from the sample of PGNA only camps, their participation in fishing from baseline to endline increased only marginally (by 3 percentage points), and the percentage of women who fished declined by 7 points. The sample from PGNA + GTC camps increased their involvement in fishing from baseline to endline by 31 percentage points ($p = 0.0007$), and the change was the result of women's participation in fishing increasing from 5 to 75 percentage points from baseline to endline ($p < 0.0001$). People from both PGNA only and PGNA + GTC camps significantly increased their participation in processing, by 49 and 38 percentage points, respectively. While the change in the proportion of women who processed fish from both sets of camps also increased, only the increase in the proportion of women from PGNA + GTC camps was statistically significant ($p = 0.0392$). People's involvement in trading fish significantly increased for both groups, which was the result of more men trading fish. The participation in trading fish by men from

Table 6. Levels of involvement in making 'large input' into household decisions about the income generated from fishing and processing and trading fish.

Made 'large input' into decisions about income from ...	Baseline	Endline	<i>p</i> -Value
Fishing			
PGNA only (baseline <i>n</i> = 20, endline <i>n</i> = 21)	0.85 (0.37)	0.67 (0.48)	0.1804
PGNA + GTC (baseline <i>n</i> = 26, endline <i>n</i> = 40)	0.65 (0.49)	0.88 (0.33)	0.0320
Fishing (women)*			
PGNA only (baseline <i>n</i> = 2, endline <i>n</i> = 1)	0.50 (0.71)	1.00
PGNA + GTC (baseline <i>n</i> = 1, endline <i>n</i> = 15)	1.00 ...	0.93 (0.26)	...
Fishing (men)			
PGNA only (baseline <i>n</i> = 18, endline <i>n</i> = 20)	0.89 (0.32)	0.65 (0.49)	0.0880
PGNA + GTC (baseline <i>n</i> = 25, endline <i>n</i> = 25)	0.64 (0.49)	0.84 (0.37)	0.1113
Processing fish			
PGNA only (baseline <i>n</i> = 11, endline <i>n</i> = 28)	1.00 (0.00)	0.79 (0.42)	0.1000
PGNA + GTC (baseline <i>n</i> = 24, endline <i>n</i> = 40)	0.58 (0.50)	0.90 (0.30)	0.0026
Processing fish (women)			
PGNA only (baseline <i>n</i> = 6, endline <i>n</i> = 10)	1.00 (0.00)	0.90 (0.32)	0.4577
PGNA + GTC (baseline <i>n</i> = 11, endline <i>n</i> = 17)	0.45 (0.52)	0.94 (0.24)	0.0025
Processing fish (men)			
PGNA only (baseline <i>n</i> = 5, endline <i>n</i> = 18)	1.00 (0.00)	0.72 (0.46)	0.1994
PGNA + GTC (baseline <i>n</i> = 13, endline <i>n</i> = 23)	0.69 (0.48)	0.87 (0.34)	0.2077
Trading fish			
PGNA only (baseline <i>n</i> = 22, endline <i>n</i> = 32)	0.91 (0.29)	0.81 (0.40)	0.3355
PGNA + GTC (baseline <i>n</i> = 27, endline <i>n</i> = 40)	0.74 (0.45)	0.85 (0.36)	0.2742
Trading fish (women)			
PGNA only (baseline <i>n</i> = 13, endline <i>n</i> = 12)	0.85 (0.38)	0.92 (0.29)	0.6060
PGNA + GTC (baseline <i>n</i> = 17, endline <i>n</i> = 18)	0.65 (0.49)	0.94 (0.24)	0.0280
Trading fish (men)			
PGNA only (baseline <i>n</i> = 9, endline <i>n</i> = 20)	1.00 (0.00)	0.75 (0.44)	0.1062
PGNA + GTC (baseline <i>n</i> = 10, endline <i>n</i> = 22)	0.90 (0.32)	0.77 (0.43)	0.4090

Notes: PGNA: practical gender needs approach; PGNA + GTC: practical gender needs approach + gender transformative communication. Most sample sizes differ for sub-groups across baseline and endline (as indicated). Standard deviations in parentheses.

*Sample sizes were too small to test the differences in percentage points concerning women who made 'large input' into household decisions about income from fishing from baseline to endline.

PGNA only and PGNA + GTC camps increased significantly by 52 ($p < 0.0001$) and 48 ($p = 0.0002$) percentage points, respectively, from baseline to endline.

Table 6 presents the proportion of people in each group who answered making 'large input' into household decisions about the income generated from fishing and processing and trading fish. The percentage of people from PGNA only camps who made 'large input' into decisions about income from fishing declined by 18 points, while the sample from PGNA + GTC camps increased their involvement in making these decisions by 23 percentage points ($p = 0.0320$). The latter result was mostly due to the increase in women who indicated they made 'large input' into making these decisions from baseline (one woman) to endline (14 out of 15 women).⁵ No statistically significant changes were found in men's involvement in making these decisions about income from fishing in both sets of camps. The percentage of people from PGNA only camps who reported making 'large input' into decisions about income from processing fish declined by 21 percentage points ($p = 0.1000$), while those from PGNA + GTC camps increased by 32 percentage points and the change was statistically significant at the 1% confidence level ($p = 0.0026$). Concerning the percentage of women from PGNA only camps who reported making 'large input' into decisions about income from processing fish there was a decline by 10 percentage points ($p = 0.4577$), yet for women from PGNA + GTC camps there was a statistically

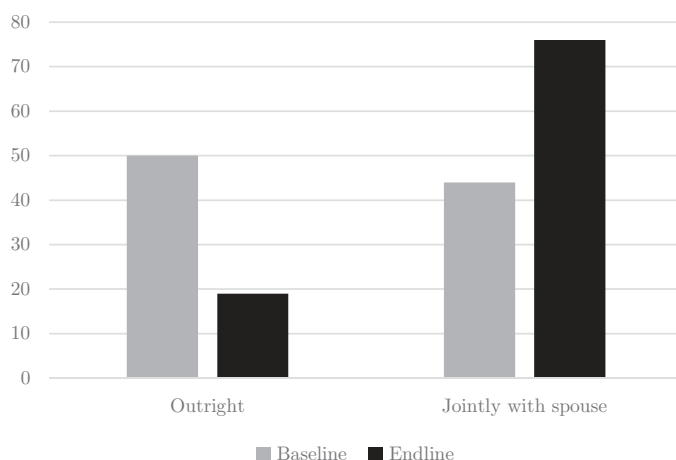


Figure 1. Changes in fishing gear ownership status of men from PGNA + GTC camps. Notes: PGNA + GTC = practical gender needs approach + gender transformative communication. 18 men at baseline and 21 at endline were included in the analysis. Both changes in ownership status from baseline to endline were statistically significant at the 5% level. Numbers on y-axis indicate percentages (%).

significant increase by 49 percentage points ($p = 0.0025$). The percentage of women from PGNA only camps who reported making 'large input' into decisions about income from trading fish increased by 7 points ($p = 0.6060$), and the percentage of women from PGNA + GTC camps increased by 30 points ($p = 0.0280$).

Regarding the changes in ownership status of key value chain assets, the percentage of people who indicated they owned fishing gear increased by 14 points from baseline to endline, although only the change in the percentage of men from PGNA + GTC camps (an increase by 16 points) was statistically significant ($p = 0.0376$). When examining who owned the fishing gear in the household⁶ (see Figure 1), it was found that a large percentage of men from PGNA + GTC camps shifted their ownership status from owning the gear outright to jointly owning with their spouses. At baseline, 50% responded that they owned the fishing gear outright, and at endline, only 19% stated they were the sole owners of the fishing gear ($p = 0.0419$). Forty-four percent responded they jointly owned the fishing gear at baseline and this increased to 76% at endline ($p = 0.0433$). No statistically-significant changes in fishing gear ownership status of men from PGNA only camps were found.

Discussion and conclusion

To elucidate how fisheries extension and development programs can effectively address gender constraints – in conjunction with technical constraints – this study investigated how a gender accommodative approach compares to a gender transformative approach in terms of influencing women's empowerment outcomes within

a post-harvest fish loss reduction intervention. In particular, the study investigated: influence on decision-making powers about the income generated through fishing, processing, or trading fish; ownership status of key value chain assets; and changes in gender attitudes. In doing so, the study assessed multiple dimensions and levels of women's empowerment. Compared to a single dimension or level analysis, this type of assessment enables a more holistic representation of changes in women's abilities to make strategic life choices and the structural barriers that often deny such choices (see Cornwall, 2016, p. 345).

In terms of methodological insights, prior to this project, appropriate survey instruments to assess multi-dimensional and multi-level changes in women's empowerment in fishery value chains were lacking in this context. The project developed and implemented a novel adaptation of the WEAI, which assessed multiple domains, adapted them to a capture fishery value chain context, and enabled an assessment of women's empowerment at both the relational and environmental levels. This study suggests that the WEFI is a valuable tool for application in a small-scale fishery setting to assess gendered dynamics in the value chain and multiple dimensions and levels of women's empowerment. Research or development projects working in such contexts that wish to use the WEFI are highly encouraged to modify it to fit the local context, and ideally, ascertain insider or 'emic' perspectives on women's empowerment to further strengthen the tool. Working with fisheries extension officers when contextualizing the WEFI will improve the instrument's utility to benchmark gendered nuances in the value chain, to evaluate changes in women's empowerment and gender transformative change overtime, and help develop officers' capacities to carry out gender research and provide gender-aware extension services.

The study results indicate gender equal attitudinal changes in both the PGNA only and PGNA + GTC camps, but only a statistically significant change in the latter. The increase in mean gender equal attitude scores of the sample from the PGNA + GTC camps was more than twice as high as the scores of the sample from the PGNA only camps at endline. These results suggest that the use of a transformative approach led to greater gains compared to using an approach that aims to help facilitate the empowerment of women yet accommodates existing gender norms and power relations. Similar changes in gender attitudes have resulted in other settings where men were engaged using gender transformative approaches (Verma et al., 2006; Van den Berg et al., 2013; Pulerwitz, Hui, Arney, & Scott, 2015). Together, these results provide evidence that communication tools can be an effective means of shifting attitudes regarding sensitive subject matters in small-scale fishery settings. The attitudinal changes that resulted from the use of a transformative approach are important as unequal attitudes underlie unequal behaviors and restrict women's exercise of choice and voice (van Eerdewijk et al., 2017; National Academies of Sciences, Engineering, and Medicine, 2018). How sustainable these attitudinal changes are over time remains an important research question to explore in the longer term.

In addition to influencing gender attitudes, the application of the GTC tool had a concurrent effect on improving a number of other women's empowerment outcomes compared to only using a practical gender needs approach. Women from PGNA + GTC camps compared to women from PGNA only camps became more active in key value

chain activities, especially fishing. Moreover, the decision-making powers of women from PGNA + GTC camps concerning the use of income generated from processing and trading fish increased significantly from baseline to endline, which was not the case for women from the PGNA only camps. As well as being intrinsically important, these changes in empowerment have instrumental value (see O'Neil, Domingo, & Valters, 2014). The increase in women's control of the income generated through fishery-related activities is significant in contexts facing chronic poverty as decisions made by women on how to use resources are understood to take into account the needs of other household members, including children and the most vulnerable (Bradshaw, Castellino, & Diop, 2013; see also Cole et al., 2015).

For men from PGNA + GTC camps but not from PGNA only camps, a change in ownership status occurred with their fishing gear, arguably the most important 'male' asset in this fishery. This is significant because it is well established in the literature that women compared to men in small-scale fisheries lack access to or control over certain resources and assets (Weeratunge, Snyder, & Sze, 2009; Lentisco & Lee, 2015). Addressing this gap has the potential to enable women's greater participation in and returns from value chain activities or increase their involvement in fisheries governance processes.

The findings from this study suggest that when unequal gender norms, attitudes, and power relations are surfaced through gender transformative communication tools (in this case drama skits) to help build a critical consciousness at community and other levels, positive changes in women's empowerment outcomes can result. Cornwall (2016, p. 345) emphatically stresses this point, calling for more efforts that produce 'shifts in consciousness' as one key lever to address the underlying causes of gender inequalities. It is important to note that the changes evaluated in this study were assessed over a relatively short period of time, and therefore, it is equally important to assess the sustainability of these changes in the longer term, and especially, to determine *how* these changes are sustained (or not).

Returning to the point raised in the Introduction that constraints underlying post-harvest losses are both technical and social in nature (Cole et al., 2018), the findings also imply that integrating gender transformative approaches together with technical innovations offer a potentially potent way forward to address food losses. In particular, the findings underscore that the former make more substantive contributions when the approach not only accommodates gender barriers, but explicitly challenges and seeks to address prevailing unequal gender norms, attitudes, and power relations. By tackling the technical and social constraints in value chains in tandem, small-scale fisheries have greater potential to contribute toward enhancing the food, nutrition, and economic security of all people who depend on their natural resources.

In conclusion, the study concurs that global development challenges – as embodied by the Sustainable Development Goals (SDGs) – will not be resolved through technical innovations alone (Kantor, 2013). Rather, women's empowerment is a pre-condition for success of the SDGs including ending poverty. Helping enable women to empower themselves will rely on development and extension programs using effective approaches available to them and appropriate to their contexts. The findings of this study can contribute to informed decision making by programs in this area.

Specifically, the study underscores that programs may underachieve in terms of gender equality and women's empowerment aims if they opt for approaches and strategies that seek to engage women but do not address underlying structural barriers, such as unequal norms and attitudes. Feminist scholars have stressed this point for decades (Batliwala, 1993; Cornwall, 2016; Kabeer, 1994). Extension and value chain development programs that engage people reflexively on these underlying structural barriers, through a context-appropriate gender transformative approach, may increase the effectiveness with which programs address the social and gender issues that otherwise constrain fishery-dependent women and men in making strategic life choices and improving their lives and livelihoods.

Notes

1. Cornwall (2016, p. 344) considers building critical consciousness as a 'process of changing the way people see and experience their worlds that can raise awareness of inequalities, stimulate indignation about injustice and generate the impetus to act together to change society.'
2. In the plain, some camps are temporary given the flooding during parts of the year, while others are built up and are permanent, though usually only accessible by boat during the rainy season.
3. See Alkire et al. (2013), Sraboni, Malapit, Quisumbing, & Ahmed (2014), and Malapit et al. (2017) for detailed information on the WEAI.
4. Gender norms '...are collectively (rather than individually) held definitions of socially approved behavior ...[and] deeply engrained in our identities and sense of self' (van Eerdewijk et al., 2017, p. 40).
5. Note, too few women from PGNA only camps (two total) reported making 'large input' into household decisions about income generated from fishing at endline (one of these two women reported this at baseline), making it meaningless to carry out an analysis. A total of 14 out of 15 women from PGNA + GTC camps reported making 'large input' into decisions at endline, however, and only one woman reported making 'large input' into decisions at baseline. The increase from one woman at baseline to 14 women at endline is a significant result.
6. Analysis of who owned the asset was carried out only with those in the sample who indicated they were married.

Acknowledgements

The research was undertaken as part of the CGIAR Research Programs on Aquatic Agricultural Systems (AAS) and Fish Agrifood Systems (FISH). The authors thank all donors who supported these programs through their contributions to the CGIAR Fund. We wish to thank the Department of Fisheries officers who collected the longitudinal data that were analyzed for this paper and the project participants for taking part in the study. The authors extend their sincere gratitude to the anonymous reviewers for their constructive feedback on earlier drafts of the manuscript. Any errors are the responsibilities of the authors.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

Funding support for this study came from the International Development Research Center (IDRC) and the Australian Center for International Agricultural Research (ACIAR) under the Cultivate Africa's Future fund [No. 107837].

Notes on contributors

Steven Michael Cole is a Senior Scientist and Gender Research Coordinator for the International Institute of Tropical Agriculture. He obtained his PhD in Biological Anthropology from the University of Arizona. He also holds a MSc degree in Agricultural and Resource Economics and a BSc in Health and Nutrition. He led the social science research for WorldFish in Zambia from 2013 to 2019, integrating gender and other social science perspectives in aquaculture, small-scale fisheries, value chains and nutrition research.

Alexander Michael Kaminski is a PhD student at the Institute of Aquaculture at the University of Stirling, UK. He holds a MA degree in Development and Governance and a MA degree in Development Studies. Prior to starting his PhD, he worked with WorldFish in Zambia on the project described in this manuscript (2015–2017).

Cynthia McDougall is the Gender Research Leader for WorldFish and the CGIAR Research Program on Fish Agri-food Systems (FISH). She is an interdisciplinary social scientist and her work currently spans small-scale fisheries, sustainable aquaculture, and food and nutrition security in Asia and Africa. She holds a MPhil (Geography) from Cambridge University in the UK, and a PhD (Knowledge, Technology and Innovation) from Wageningen University, The Netherlands.

Alexander Shula Kefi is the Project Coordinator for the Zambia Aquaculture Enterprise Development Project, which is co-financed by the African Development Bank (AfDB) and the Government of the Republic of Zambia (GRZ). He holds a PhD in Aquaculture and Fisheries Science from the University of Malawi. Prior to his current position, he was the Chief Aquaculture Research Officer in the Department of Fisheries of the Ministry of Fisheries and Livestock, Zambia.

Pamela Marinda is a lecturer in the Department of Food Science and Nutrition at the University of Zambia. She holds a PhD in Agricultural Economics from the University of Hohenheim, Germany, majoring in food security and nutrition. Her research interests are on issues of food security, nutrition, food value chains and gender in agriculture. She is passionate about improving food security, nutrition and health in the life cycle, especially for the vulnerable poor.

Modern Maliko is a Department of Fisheries Officer in the Ministry of Fisheries and Livestock, Zambia. He worked on the project described in this manuscript and was involved in helping carry out all the research activities.

Johans Mtonga is the Executive Director at the Zambia Center for Communication Programmes. He holds a BA Degree in Development Studies and is a MSc Finalist in Projects, Operations and Supply Chain, both from the University of Zambia. He also holds a diploma in Sexual Reproductive Health and Rights from Lund University in Sweden. He has a certificate in Leadership in Strategic Health Communication from John Hopkins University. He is passionate about gender equity, empowerment, and social justice.

ORCID

Steven M. Cole  <http://orcid.org/0000-0002-8947-0871>

Alexander M. Kaminski  <http://orcid.org/0000-0001-5148-0460>

Cynthia McDougall  <http://orcid.org/0000-0002-5606-6813>

Pamela A. Marinda  <http://orcid.org/0000-0001-7848-6125>

References

- Adeogun, M.O., & Adeogun, O.A. (2015). Determinants of use of indigenous fish processing practices in maritime and inland states of Nigeria. *Journal of Agricultural Extension*, 19, 24–34.
- Akande, G., & Diei-Ouadi, Y. (2010). *Post-harvest losses in small-scale fisheries: Case studies in five sub-Saharan African countries*. Fisheries and Aquaculture Technical Paper No. 550. Rome: Food and Agriculture Organization of the United Nations [FAO].
- Alkire, S., Meinzen-Dick, R., Peterman, A., Quisumbing, A., Seymour, G., & Vaz, A. (2013). The Women's Empowerment in Agriculture Index. *World Development*, 52, 71–91. doi:10.1016/j.worlddev.2013.06.007
- Batliwala, S. (1993). *Empowerment of women in South Asia: Concepts and practices*. Mumbai: Asian-South Pacific Bureau of Adult Education.
- Béné, C., Barange, M., Subasinghe, R., Pinstrip-Andersen, P., Merino, G., Hemre, G.I., & Williams, M. (2015). Feeding 9 billion by 2050 – Putting fish back on the menu. *Food Security*, 7, 261–274. doi:10.1007/s12571-015-0427-z
- Bjorndal, T., Child, A., & Lem, A. (2014). *Value chain dynamics and the small-scale sector: Policy recommendations for small-scale fisheries and aquaculture trade*. Fisheries and Aquaculture Technical Paper No. 581. Rome: FAO.
- Bradshaw, S., Castellino, J., & Diop, B. (2013). *Women's role in economic development: Overcoming the constraints*. Background paper for the high-level panel of eminent persons on the post-2015 development agenda. New York: Sustainable Development Solutions Network: A Global Initiative for the United Nations.
- Cole, S.M., Kantor, P., Sarapura, S., & Rajaratnam, S. (2014). *Gender transformative approaches to address inequalities in food, nutrition, and economic outcomes in aquatic agricultural systems in low-income countries* (Program Working Paper AAS-2014-42). Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems.
- Cole, S.M., Puskur, R., Rajaratnam, S., & Zulu, F. (2015). Exploring the intricate relationship between poverty, gender inequality and rural masculinity: A case study from an aquatic agricultural system in Zambia. *Culture, Society and Masculinities*, 7, 154–170.
- Cole, S.M., McDougall, C., Kaminski, A.M., Kefi, A.S., Chilala, A., & Chisule, G. (2018). Postharvest fish losses and unequal gender relations: Drivers of the social-ecological trap in the Barotse Floodplain fishery, Zambia. *Ecology and Society*, 23, 18. doi:10.5751/ES-09950-230218
- Commonwealth Secretariat. (2001). *Gender mainstreaming in agriculture and rural development: A reference manual for governments and other stakeholders*. London, UK: Commonwealth Secretariat.
- Cornwall, A. (2016). Women's empowerment: What works? *Journal of International Development*, 28, 342–359. doi:10.1002/jid.3210
- FAO. (2011). *Mainstreaming gender into project cycle management in the fisheries sector*. Field manual. Bangkok: FAO.
- FAO. (2013). *Good practice policies to eliminate gender inequalities in fish value chains*. Rome: FAO.
- FAO. (2014). *Gender in food and nutrition security programming: Conducting a gender analysis for programme design*. Rome: FAO.
- FAO. (2016). *Developing gender-sensitive value chains – A guiding framework*. Rome: FAO.
- Farnworth, C.R., Kantor, P., Kruijssen, F., Longley, C., & Colverson, K. (2015). Gender integration in livestock and fisheries value chains: Emerging good practices from analysis to action. *International Journal of Agricultural Resources, Governance and Ecology*, 11, 262–279. doi:10.1504/IJARGE.2015.074093
- Freire, P. (2000). *Pedagogy of the oppressed*. London: Bloomsbury Publishing.
- Fröcklin, S., de la Torre-Castro, M., Lindström, L., & Jiddawi, N.S. (2013). Fish traders as key actors in fisheries: Gender and adaptive management. *AMBIO*, 42, 951–962. doi:10.1007/s13280-013-0451-1

- High Level Panel of Experts [HLPE]. (2014). A report by the high level panel of experts on food security and nutrition of the committee on world food security. *Sustainable fisheries and aquaculture for food security and nutrition*. Rome: FAO.
- Hillenbrand, E., Karim, N., Mohanraj, P., & Wu, D. (2015). *Measuring gender-transformative change: A review of literature and promising practices*. Working Paper. USA: CARE.
- Interagency Gender Working Group [IGWG]. (2017). *The gender integration continuum: training session user's guide*. Washington D.C.: Population Reference Bureau, United States Agency for International Development (USAID).
- Kabeer, N. (1994). *Reversed realities: Gender hierarchies in development thought*. London, UK: Verso.
- Kaminski, A.M., Cole, S.M., Kefi, A.S.A., Haddad, R.E., Chilala, A., Chisule, G., ... Ward, A.R. Fish losses for whom? A gendered assessment of post-harvest fish losses in the Barotse Floodplain, Zambia. Unpublished manuscript.
- Kantor, P. (2013). *Transforming gender relations: A key to lasting positive agricultural development outcomes* (Brief: AAS-2013-12). Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems.
- Kefi, A.S., Cole, S.M., Kaminski, A.M., Ward, A., & Mkandawire, N.L. (2017). Physical losses of fish along the value chain in Zambia: A case study of Barotse Floodplain. *International Journal of Fisheries and Aquaculture*, 9, 98–107. doi:10.5897/IJFA2017.0638
- Kruijssen, F., McDougall, C.L., & van Asseldonk, I.J. (2018). Gender and aquaculture value chains: A review of key issues and implications for research. *Aquaculture*, 493, 328–337. doi:10.1016/j.aquaculture.2017.12.038
- Lentisco, A., & Lee, R.U. (2015). *A review of women's access to fish in small-scale fisheries (FAO Fisheries and Aquaculture Circular No. 1098)*. Rome: FAO.
- Lombardini, S., Bowman, K., & Garwood, R. (2017). *A 'how to' guide to measuring women's empowerment: Sharing experience from Oxfam's impact evaluations*. Oxford: Oxfam GB.
- Lynch, A.J., Cowx, I.G., Fluet-Chouinard, E., Glaser, S.M., Phang, S.C., Beard, T.D., ... Youn, S. (2017). Inland fisheries – Invisible but integral to the UN Sustainable Development Agenda for ending poverty by 2030. *Global Environmental Change*, 47, 167–173. doi:10.1016/j.gloenvcha.2017.10.005
- Malapit, H., Pinkstaff, C., Sproule, K., Kovarik, C., Quisumbing, A., & Meinzen-Dick, R. (2017). *The abbreviated women's empowerment in agriculture index (A-WEAI)*. IFPRI Discussion Paper 01647. Washington D.C.: International Food Policy Research Institute.
- McDougall, C., Cole, S.M., Rajaratnam, S., Brown, J., Choudhury, A., Kato-Wallace, J., ... Teioli, H. (2015). Implementing a gender transformative research approach: Early lessons. In B. Douthwaite, J. M. Apgar, A. Schwarz, C. McDougall, S. Attwood, S. Senaratna Sellamuttu, & T. Clayton (Eds.), *Research in development: Learning from the CGIAR Research Program on Aquatic Agricultural Systems* (pp. 41–56). Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems.
- Mezirow, J. (2000). *Learning as transformation: Critical perspectives on a theory in progress*. The Jossey-Bass Higher and Adult Education Series. San Francisco: Jossey-Bass Publishers.
- Nanda, G. (2011). *Compendium of gender scales*. Washington D.C.: FHI 360/C-Change.
- National Academies of Sciences, Engineering, and Medicine. (2018). *Addressing the social and cultural norms that underlie the acceptance of violence: Proceedings of a workshop in brief*. Washington, D.C.: The National Academies Press.
- O'Neil, T., Domingo, P., & Valters, C. (2014). *Progress on women's empowerment: From technical fixes to political action*. Working Paper 06. UK: Overseas Development Institute.
- Poulsen, E. (2016). *Gender mainstreaming in agricultural value chains: Promising experiences and the role of rural advisory services*. Lausanne, Switzerland: GFRAS.
- Pulerwitz, J., Hui, W., Arney, J., & Scott, L.M. (2015). Changing gender norms and reducing HIV and violence risk among workers and students in China. *Journal of Health Communication*, 20, 869–878. doi:10.1080/10810730.2015.1018573

- Rajaratnam, S., Cole, S.M., Fox, K.M., Dierksmeier, B., Puskur, R., & Zulu, F. (2015). *Social and gender analysis report: Barotse Floodplain, Western Province, Zambia* (Program Report: AAS-2015-18). Penang, Malaysia: CGIAR Research Program on Aquatic Agricultural Systems.
- Rajaratnam, S., Cole, S.M., Kruijssen, F., Sarapura, S., & Longley, C. (2016). Gender inequalities in access to and benefits derived from the natural fishery in the Barotse Floodplain, Zambia, Southern Africa. *Asian Fisheries Science Journal*, 29S, 49–71.
- Rottach, E., Schuler, S.R., & Hardee, K. (2009). *Gender perspectives improve reproductive health outcomes: New evidence*. Washington D.C.: Population Reference Bureau, United States Agency for International Development (USAID).
- Sraboni, E., Malapit, H.J., Quisumbing, A.R., & Ahmed, A.U. (2014). Women's empowerment in agriculture: What role for food security in Bangladesh? *World Development*, 61, 11–52. doi:10.1016/j.worlddev.2014.03.025
- Tesfay, F., & Teferi, M. (2017). Assessment of fish post-harvest losses in Tekeze dam and Lake Hashenge fishery associations: Northern Ethiopia. *Agriculture and Food Security*, 6, 1–12.
- Turpie, J., Smith, B., Emerton, L., & Barnes, J. (1999). *Economic value of the Zambezi Basin wetlands*. Cape Town, South Africa: University of Cape Town.
- Van den Berg, W., Hendricks, L., Hatcher, A., Peacock, D., Godana, P., & Dworkin, S. (2013). 'One Man Can': Shifts in fatherhood beliefs and parenting practices following a gender-transformative programme in Eastern Cape, South Africa. *Gender & Development*, 21, 111–125. doi:10.1080/13552074.2013.769775
- van Eerdewijk, A., Wong, F., Vaast, C., Newton, J., Tyszler, M., & Pennington, A. (2017). *White paper: A conceptual model of women and girls' empowerment*. Amsterdam: Royal Tropical Institute (KIT).
- Verma, R.K., Pulerwitz, J., Mahendra, V., Khandekar, S., Barker, G., Fulpagare, P., & Singh, S.K. (2006). Challenging and changing gender attitudes among young men in Mumbai, India. *Reproductive Health Matters*, 14, 135–143. doi:10.1016/S0968-8080(06)28261-2
- Webber, C.M., & Labaste, P. (2010). *Building competitiveness in Africa's agriculture: A guide to value chain concepts and applications*. Washington, DC: The World Bank.
- Weeratunge, N., Snyder, K.A., & Sze, C.P. (2009, April). *Gleaner, fisher, trader, processor: Understanding gendered employment in the fisheries and aquaculture sector*. Paper presented at the Workshop on Gaps, Trends and Current Research in Gender Dimensions of Agricultural and Rural Employment: Differentiated Pathways Out of Poverty. Rome, Italy.
- Welcomme, R.L., Cowx, I.G., Coates, D., Béné, C., Funge-Smith, S., Halls, A., & Lorenzen, K. (2010). Inland capture fisheries. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 365, 2881–2896. doi:10.1098/rstb.2010.0168
- White, H., & Sabarwal, S. (2014). *Quasi-experimental design and methods. Methodological Briefs: Impact Evaluation 8*. Florence: UNICEF Office of Research.
- Witt, R., Pemsil, D.E., & Waibel, H. (2010). Collecting data for poverty and vulnerability assessment in remote areas in sub-Saharan Africa. *Survey Methodology*, 36, 217–222.
- Wong, F., Vos, A., Pyburn, R., & Newton, J. (2019). *Implementing gender transformative approaches in agriculture*. A Discussion Paper for the European Commission. Amsterdam: CGIAR Collaborative Platform for Gender Research.