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Gender differences in smallholder farmers' use of information sources to cope with drought in Masindi District, Uganda

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Abstract

The study was conducted to determine gender differences in farmers' use of information sources, the perceived characteristics of those sources, and the perceived effectiveness of the messages to cope with drought. A cross-sectional survey was implemented for 313 respondents (167 men and 146 women) in Masindi District. Results showed that both men and women farmers embraced extended farming practices such as early planting at the onset of rains, growing of short-term crops like beans, and growing drought resistant crops, to mention but a few, to cope with drought. Men and women differed significantly in reporting information sources ($\chi^2 = 8.117$, $p < 0.05$). 85% of the women and 77% of the men obtained the information from fellow farmers, majorly male. Over 80% of the men and women perceived fellow farmers to have positive communication behavior, and farming innovativeness, but women perceived these characteristics of fellow farmers more favorably than men. Similarly, the majority of men and women reported that fellow farmers were effective in terms of 'usefulness of information', 'timeliness of information', 'affordability of information', 'accuracy of information', 'relevance of information' and 'ability of the information obtained to address problems faced'. Women's perception of relevance of the information obtained from

fellow farmers was significantly higher than of men ($U=6764.000$, $p<.001$). For other sources, 80% of the women and 43% of the men relied on farmers' organizations, while 78% of the men and 21% of the women relied on local government extension for information. Women perception of the reliability of the information obtained from local government was still significantly higher than that of the men ($U=3264.500$, $p<.05$). Therefore, fellow farmers remain important and reliable sources of information to cope with drought for farmers, especially the women; and a gender gap exists as far as access to government extension services is concerned. Extension agencies including local governments, non-governmental organizations, the private sector, and farmers' organizations need to identify and work with reliable fellow farmers as conduits for appropriate information. Incentives for such farmers may also be put in place to ensure long-term commitment.

Key words: Climate smart information and technologies, Farmer organizations, Fellow farmers, Government extension, Mann-Whitney U test

Introduction

Agriculture remains the most important livelihood strategy for the majority of Sub-Saharan Africa's (SAA) rural dwellers (Giller *et al.*, 2021; De la O Campos *et al.*, 2025). Both men and women contribute substantively to agriculture, and in some cases, women more so than men (Palacios-Lopez, *et al.*, 2017; Doss, 1999). Despite their contribution, women in most societies and cultures face inequalities compared to men regarding access to and control over agricultural production resources, services and benefits (Awiti, 2022). The socio-cultural norms usually give men more power and rights over controlling resources, and keep women in subordinate positions (Clancy, 2019). Gender equity demands that the barriers to equal access and control of resources/benefits among men and women are removed. It is also reported that when women have greater access to and control of productive resources and benefits, families do better economically, food and nutrition security is enhanced, as well as agricultural productivity and profitability (Doss, 2018). However, gender-responsive solutions and support mechanisms that leverage on available societal opportunities cannot be identified without gender-disaggregated data (Awiti, 2022; Puskur and Aayushi, 2024; Wright *et al.*, 2024).

Climate change, particularly drought, is one of the most devastating phenomena that has affected agriculture globally and Uganda in particular, with distinct gendered effects (GoU, 2007; MAAIF, 2018; Clancy, 2019; Awiti, 2022). According to the World Meteorological Organization (WMO), drought is a period of abnormally dry weather characterized by a prolonged deficiency of precipitation below a certain threshold over a large area and a period longer than a month (Cammalleri, 2021). Droughts have numerous devastating effects, particularly on rainfed agriculture, which

is dominant in SSA (Clancy, 2019), including loss of water for production, lowered productivity, crop and livestock losses leading to reduced incomes, increased food prices, famine, and poverty (Shiferaw *et al.*, 2014). Additionally, droughts cause natural resource depletion, and environmental insecurity of entire populations and economies (Owoyesigire *et al.*, 2016; King-Okumu *et al.*, 2021; Mfitumukiza *et al.*, 2024). Drought's impact varies across socio-economic groups and genders (Ongoro and Ogara, 2020). Due to the gender inequalities in access to resources and services, women become more vulnerable to drought, which can limit their ability to choose effective adaptation options compared to men (Chaudhury *et al.*, 2012; Ongoro and Ogara, 2012; Clancy, 2019; Awiti, 2022; Mfitumukiza *et al.*, 2024).

Adaptation measures to climate change include diversifying crops, changing planting dates and crop establishment methods, use of soil and water conservation methods, use of drought-resistant crops and crop varieties, and diversifying into non-agricultural activities (Shiferaw *et al.*, 2014; Clancy, 2019). However, access to these options is often suboptimal due to a lack of access to the sources of the required information and technologies (Nabikolo *et al.*, 2012), particularly among women farmers (Kisauzi *et al.*, 2012). It has been shown that men and women within specific socio-cultural and agroecological settings are likely to differ in their access to sources of information on weather and climate, and coping strategies to drought (Tall *et al.*, 2014; Awiti, 2022; Mfitumukiza *et al.*, 2024). Some studies report that the differences in the use of information and information sources is linked to capacity, resource access, proximity and farming roles and challenges faced by men and women farmers (Nosheen *et al.*, 2010; Kyazze *et al.*, 2012).

Agricultural families rely on various sources of information on weather and agro-advisories. These sources include radio, extension agencies, farmers' organizations, telephone short messaging systems (SMS), fellow farmers, climate dialogues, and information boards (Kisauzi *et al.*, 2012; Kyazze *et al.*, 2012; Tall *et al.*, 2014; Assan *et al.*, 2018; Ongoro and Ogara, 2020; Awiti, 2022). Differences in use of information sources to cope with drought by gender have been observed in eastern Uganda (Kisauzi *et al.*, 2012); Ethiopia (Ragasa *et al.*, 2013); India (Lambrou and Nelson, 2012) and in Pakistan (Lamontagne-Godwin *et al.*, 2018). Kisauzi *et al.* (2012) found that there was less access to radio, extension and farmer groups for the women; making them less likely to receive climatic information and adaptation solutions. In Kenya, women had access to radio for climate information (Cherotich *et al.*, 2012), while a Ghanaian study found that women tended to rely on fellow farmers while men can get information from agricultural extension agencies to cope with drought much more easily (Assan *et al.*, 2018). To develop effective, gender-responsive drought coping and resilience strategies, it's crucial to analyze the information sources used by men and women in specific socio-cultural and agro-

ecological contexts (Tall *et al.*, 2014; Awiti, 2022; Mfitumukiza, *et al.*, 2024). This analysis is essential for ensuring that strategies are tailored to the unique needs and perspectives of both genders. On the other hand, the characteristics of information sources are likely to reveal their capacity to offer effective and relevant climate information and adaptation solutions to both women and men farmers.

Men and women users are likely to perceive the information sources differently in terms of reliability, innovativeness, legitimacy, dependability, approachability, influence and level of social interaction (Anaeto *et al.*, 2012; McOmber *et al.*, 2013). If gender-responsive and inclusive success in coping with drought is to be achieved, the level of usefulness, accessibility, availability, credibility accuracy, reliability, affordability, timeliness and relevance of the information needs to be unravelled (Mtambanengwe *et al.*, 2012; Mwambi *et al.*, 2015). While some studies have looked at gendered differences in access to weather and climate information, the channels used, effects/impact of climate change, and adaptation measures (Kyazze *et al.*, 2012; Tall *et al.*, 2018; Clancy, 2019; Rengalakshmi *et al.*, 2020; Awiti, 2022), a gap exists about the gendered differences in the sources of information relied on to cope and adapt to drought, the characteristics of the sources, and the perceived effectiveness of the messages by the users.

This study sought to bridge the gaps with Masindi district as a case study. Masindi district is 7,443 square kilometers in area with a population of 342,635, including 166,626 men and 176,009 women (UBOS, 2024). The district was chosen because of its frequent drought occurrences, variability in rainfall, and its being in the cattle corridor, a fragile region that experiences frequent dry conditions (GoU, 2007; Owoyesigire *et al.*, 2016; Wamatsembe *et al.*, 2017; Nakiguli, *et al.*, 2023). According to Owoyesigire *et al.* (2016), Masindi was one of the three districts including Soroti and Mbarara in the cattle corridor of Uganda whose daily rainfall and temperature data from 1961 to 2013 revealed an increase in the percentage of hot days, a reducing trend of consecutive wet days, and an increasing trend of consecutive dry days; and had experienced severe droughts between 1991 and 2000. Masindi had also experienced four successive dry years from 1965 to 1968, from 1973 to 1976, while five were experienced between 1982 and 1986, and between 2001 and 2005 (Owoyesigire *et al.*, 2016).

Given Masindi district's drought proneness, and potential to have deepened vulnerability of its communities in terms of their livelihoods and natural resource systems to drought, and the need to build resilience, it was chosen as the study area. A gendered perspective on sources of information, their character, and effectiveness of the messages delivered to cope with drought in Masindi was missing in related scientific literature. The objective of this study was to determine the gender differences in the

smallholder farmers' use of information sources when coping with drought. Key research questions included: What differences existed in men and women's use of information sources to cope with drought? What pattern existed between the sex of specific individual information seekers and the sex and number of the information sources relied on? How did men and women farmers characterize the information sources and how did they perceive the effectiveness of the information accessed?

Materials and methods

Study area

This study was conducted in Masindi District, South Western Uganda, located 1°40'28" North, 31°42'54" East. Masindi district is majorly a plateau, on average at 1295 meters above sea level, with average maximum temperatures of between 25°C and 29°C, and an average annual rainfall of 1304 mm. The soils are well drained tropical soils, generally acidic, including deep black clays, sandy alluvials, and kaiso beds. The key crops are banana, maize, sweet potato, beans, while cotton, sugar cane, tobacco, and coffee are key cash crops. Key vegetation types include tropical forests, savannah grassland and woodland, swamps, and cultivated areas (GoU, 2016; <https://masindi.go.ug>).

Study design and sample selection

A cross-sectional survey design was adopted to analyze gender differences in smallholder farmers' use of information sources to cope with drought. A multistage stratified random sampling technique was used to select smallholder farmer household heads as respondents. The first stage involved the selection of sites based on rainfall patterns to represent three major zones including; a high rainfall zone (1000 – 1200 mm of rainfall per annum), a medium rainfall zone (800 mm – 1,000 mm per annum of rainfall per annum) and a low rainfall zone (less than 800mm of rainfall per annum) (UBOS, 2016). Out of its 7 sub-counties, 3 were selected each representing a rainfall zone including Pakany, Miirya, and Kimengo sub-counties. Each had a population of 12654, 4555, and 2924 households, respectively (UBOS, 2016). The study sample was obtained using the Yamane (1967) formula (as cited in Adam, 2020) below:

$$n = \frac{N}{1+N(e^2)} \dots\dots\dots (1)$$

Where: n is the sample size, e is the margin of error, normally set at 0.05 (which is 5% of acceptable sampling error). Using a household population (N) of 20,133, the actual sample size (n) was computed to 398 respondents. In the second stage of selecting parishes, two parishes were drawn from the largest sub-county and one

from each of the other sub-counties. The third stage of selecting villages, based on the number of villages per parish, six villages were selected from the largest sub-county, and one from each of the other sub-counties (Table 1). In the fourth stage of selecting households, a proportionate ratio system at village level based on the number of households per village within a parish was used, equal numbers of male and female headed households were selected (Table 1). Male household heads were randomly selected, while *de jure* female household heads were expressly selected. *De facto* female household heads were purposively selected in the absence of their spouses to raise the female household heads. While 398 respondents were surveyed, only 313 respondents (167 men and 146 women) were considered for the analysis, as 79 questionnaires were dropped on account of incomplete data.

Table 1. Final samples of used for the study

Sub county	Parish	Total number of villages	Number of sampled villages	Village sampled	House holds (HH) population per village	Ratio used*	Heads of HH sample derived
Kimengo	Kimengo	5	1	Karwara-Kididima	90	1.5	50
Miirya	Isimba	5	1	Kyabaswa-Kyikyope	50	1	50
Pakanyi	Kihanguzi	10	2	Kidwera I	148	2.5	70
				Kigaragara	43	1	43
				Kasomoro	100	2	47
				Kisindizi II	131	2.5	62
				Kyarumbeiha	89	1.5	42
				Katumba	70	1	34
Total		39	8		721	14	398

*The ratios of the samples used in this study were computed per sub county depending on their respective villages and population

Data collection and analysis

A structured questionnaire was developed and piloted. After, it was used to collect data with the help of well-trained enumerators. The statistical package for social science (SPSS) version 20 was used in data analysis. Percentages, frequencies and Chi-square were used to analyze gender differences in farmers' use of information sources, while the Mann-Whitney *U* test was used to analyze farmers' perceptions of information sources by comparing their mean ranks.

Results

Socio-economic characteristics of the sampled respondents

A total of 58% respondents were in the age range of 18-40 years, followed by 37% who were in the age range of 41-60 years (Table 2). The mean age was 40.38. In terms of farming experience, 39%, 33%, and 28% of farmers had a farming experience of 1-10, 11-20 and 21+ years, respectively. The mean number of years of farming experience was 16.32. Ninety-three percent (93%) of the farmers considered agriculture as the most important income source, compared to 7% of the farmers who relied on non-agricultural activities. While 95% of the respondents indicated growing crops as the most important enterprise, and 5% regarded rearing livestock as the most important enterprise. Seventy-four percent (74%) of the farmers practiced annual crop growing, 57% perennial crop growing, 74% intercropping, 37% mono-cropping, and 71% mixed farming (Table 2).

Table 2. Socio-economic characteristics of respondents (n=313)

Socio-economic variables	Description	Gender of respondent		
		% Men (n=167)	% Women (n=146)	% Overall (n=313)
Age range	18-40	61	56	58
	41-60	35	40	37
	61+	5	4	5
Mean age		40.34 (sd= 10.74)	40.42 (sd= 11.45)	40.38 (sd= 11.06)
Range of years spent in independent farming	1-10	38	40	39
	11-20	31	35	33
	21+	31	25	28
Mean years in farming		16.14 (sd= 9.92)	16.53 (sd= 9.91)	16.32 (sd= 9.90)
Most important income source	Agriculture	91	95	93
	Non-Agriculture	9	5	7
Agricultural enterprise	Mainly crop	96	94	95
	Mainly livestock	4	6	5
Status of cropping system and crop type*	Intercropping	77	71	74
	Mono cropping	39	34	37
	Annual crop production	77	71	74
	Perennial crop production	62	51	57
	Mixed farming	73	69	71

*The frequencies shown and the percentages are not mutually exclusive. A respondent could have had more than one response

Sources of information used by men and women farmers to cope with drought

Fellow farmers and extension agencies were the commonly used information sources among the farmer respondents in Masindi District to cope with drought (Table 3a). Forty-three (43%) of the farmers obtained information to cope with drought from fellow farmers, while 37% used both fellow farmers and extension services. Only 20% of farmers used extension agencies to obtain information on how to cope with drought. The chi-square test showed that men and women differed significantly in the information sources they used to cope with drought ($\chi^2 = 8.117$, $p = 0.017$). Specifically, 36% of the men and 51% of the women used only fellow farmers, while 41% of the men and 34% of the women used both fellow farmers and extension agencies; whilst 23% of the men and 16% of the women only used extension agencies. So, women farmers mainly obtained most information from fellow farmers whereas men respondents equitably obtained information from both fellow farmers and extension agencies.

Table 3 (a). Sources of information used to cope with drought

Source of information	Men (n=167)		Women (n=146)		Overall (n=313)		χ^2
	f	(%)	f	(%)	f	(%)	
Both fellow farmers and extension	68	41	49	34	117	37	8.117**
Only fellow farmers	60	36	75	51	135	43	
Only extension	39	23	22	16	61	20	

**Significant at .01; f means frequency; FF – fellow farmers; Ex. = Extension agency

A myriad of methods (15) for coping with drought were obtained from fellow farmers including early or timely planting (81%), early land preparation (71%), growing short term crops like beans (62%), growing of drought resistant crops such as cassava (60%), crop diversification (54%), planting vegetables near streams (53%), and others as listed in Table 3b. Except for early planting, the percentage of men who relied on these coping methods was slightly more than that of the women (Table 3b). For information from extension agencies, most of men and women respondents obtained the information from farmers' organizations and local government agricultural extension officers (Table 3c). Again, many (11) types of drought coping methods were sourced from extension agencies; with 28% to 56% of the women obtaining that information from farmers' organizations compared to 29 – 45% for men (Table 3c). Early planting, planting early maturing crops, use of artificial fertilizers were the methods ranked highly (>45%) by both women and men and mostly obtained from farmers' organization. With regard to local government agricultural extension officers, four key methods of drought coping methods (early planting, planting early maturing crops, growing drought resistant crops, and growing multi-purpose trees) were

Table 3(b). Information obtained from fellow farmers to cope with drought

Information from the fellow farmers	Men (n=128)		Women (n=124)*		Overall (n=252)	
	f	%	f	%	f	%
Early/or timely planting	101	79*	104	84*	205	81
Early land preparation	93	73*	86	69*	179	71
Growing short term crops	82	64*	74	60*	156	62
Drought resistant crops	77	60*	73	59*	150	60
Crop diversification	70	55*	67	54*	137	54
Spraying with pesticides	73	57*	60	48	133	53
Planting vegetables near streams	74	58*	59	48	133	53
Growing cash crops	73	57*	54	44	127	50
Market food in drought	69	54*	53	43	122	48
Inorganic fertilizer use	74	58*	47	38	121	48
Stocking food stuffs in cribs	63	49	50	40	113	45
Herbicides use	57	46	50	40	107	43
Use of irrigation	52	41	42	34	94	37
Mulching gardens	50	39	33	27	83	33
Tree planting	42	33	29	23	71	28
Livestock feed preservation	30	23	11	9	41	16
Provide weather forecasts	22	17	19	15	41	16

*Shows the most obtained pieces of information by over 50% of either men, or women

reported by between 41% to 48% of the women. A similar set of drought coping methods from local government agricultural extension (early planting, planting early maturing crops, and growing multi-purpose trees) were also ranked high by men but at lower levels of between 35 – 38% (Table 3c).

Status of sex of the information-seeking farmer and sex of most-contacted fellow farmer

For information from fellow farmers, a deeper scrutiny to determine whether men and women farmers' information use was associated with the sex of fellow farmers contacted was done. The association between the sex of farmers seeking information and the sex of fellow farmers contacted was tested using a chi-square statistic revealing a significant relationship for men's ($\chi^2=14.360, p=0.001$) and women's ($\chi^2=52.026, p=0.001$) (Table 4a). Overall, 89% of the men had contact with male farmers while 11% of the men contacted women. On the other hand, 66% of the women contacted male fellow farmers, while 34% obtained information from fellow women farmers. Thus, both men and women farmers mainly obtained information from male fellow farmers. Results on the number of farmers contacted by men and women farmers

Table 3(c). Information that farmers obtained from extension service organizations to cope with drought

Information type	Type of extension service organizations															
	Local Gov. Ext.				Farmer orgs				NGO				Private Sector Company			
	Men (n=107)		Woman (n=71)		Men (n=107)		Woman (n=71)		Men (n=107)		Woman (n=71)		Men (n=107)		Woman (n=71)	
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Early planting	40	37	34	48	45	42	40	56	9	8	7	10	19	17	8	11
Early maturing crops	41	38	29	41	45	42	37	52	9	8	10	14	12	11	8	11
Fertilizer use	25	23	18	25	48	45	36	51	8	8	8	11	19	17	8	11
Drought resistant crops	40	37	33	46	35	33	20	28	8	8	7	10	11	10	6	9
Spray herbicides	30	28	19	27	41	38	32	45	9	8	8	11	19	17	8	11
Crop diversification	34	32	22	31	44	41	31	44	8	8	8	11	13	12	4	6
Multi-purpose trees	37	35	26	37	30	28	30	42	5	5	5	7	8	8	0	0
Plant perennial crops	28	26	11	16	40	38	31	44	6	6	3	4	15	14	8	11
Mulching skills	36	34	18	25	31	29	23	32	6	6	6	9	6	6	9	12
Mixed farming	27	25	22	31	35	33	25	35	3	3	5	7	6	6	6	9
Making nursery beds	31	29	12	17	31	29	26	37	4	4	7	10	12	11	6	9
Irrigation skills	21	20	12	17	37	35	27	38	5	5	7	10	11	10	4	6

Table 4a. Relationship between sex of the seeking farmer and sex of the most contacted fellow farmer for information

Men's contact with a fellow farmer by sex (n=128)	n	(%)	χ^2	p-value
Men that contacted fellow men farmers	114	89	14.360***	0.001
Men that contacted women fellow farmers	14	11		
Women's contact with a fellow farmer by sex (n=124)	n	(%)	χ^2	p-value
Women that contacted men fellow farmers	82	66	52.026***	0.001
Women that contacted fellow women farmers	42	34		

showed that both men and women contacted at least 2 or more farmers; nevertheless, men did so significantly more than women ($\chi^2=4.168$, $p = 0.041$) (Table 4b). Overall, 66% of men and women farmers contacted 2 or more fellow farmers compared to 34% that contacted only one fellow farmer (Table 4b).

Table 4b. Number of fellow farmers that men and women farmers contacted to respond to drought

Number of fellow farmers contacted	Men's contact with fellow farmers (n=128)		Women contact with fellow farmers (n=124)		Overall (n=252)		χ^2	p-value
	f	%	f	%	f	%		
Only 1 farmer	36	28	50	40	86	34	4.168*	0.041
Between 2 to 5	92	72	74	60	166	66		

**Significant at .01; f = frequency

Level of usage of extension agencies that farmers contacted most for information

The findings showed that there was a difference in the level of men's and women's use of information to cope with drought from of farmers' organizations ($\chi^2= 24.343$, $df= 1$; $p < 0.001$), local government extension agencies ($\chi^2= 54.950$, $df= 1$; $p= 0.000$), non-governmental organizations ($\chi^2= 10.711$, $df= 1$; $p= 0.001$), and private sector companies ($\chi^2= 17.371$, $df= 1$; $p < 0.001$). In three of the extension agencies (Local Government, NGO, and private sector) men had greater use, while women had greater use of farmers' organizations (Table 5a). Out of the four categories of extension agencies, 52% of the farmers contacted only one extension agency for information while 48% of the farmers contacted more than one extension agency. Most of the women (82%) contacted only one extension agency for information to

Table 5a. Extension agencies' user status among men and women farmers to cope with drought

Extension service agencies	Men (n=107)				Women (n=71)				Overall (n=178)				χ^2	df	P<0.05
	Users		Non-users		Users		Non-users		Users		Non-users				
	f	%	f	%	f	%	f	%	f	%	f	%			
Farmer Orgs	46	43	61	57	57	80	14	20	103	58	75	42	24.34**	1	0
Local Govt ext.	83	78	24	22	15	21	56	79	98	55	80	45	54.95**	1	0
Non-Govt Orgs	35	33	72	67	8	11	63	89	43	24	135	76	10.71**	1	0.001
Private sector	34	32	73	68	4	6	67	94	38	21	140	79	17.37**	1	0

**Significant at .01; f means frequency

Table 5b. Number of extension agencies that men and women contacted for information to cope with drought

No. Extension agencies used	Men (n=107)				Women (n=71)				Overall (n=178)				Chi-square test		
	Men		Women		Men		Women		Overall		Overall		χ^2	df	P<0.05
	f	%	f	%	f	%	f	%	f	%	f	%			
1	34	32	58	82	13	18	0	-	92	52	71	40	44.314**	3	.000
2	58	54	13	18	0	-	0	-	71	40	10	5			
3	10	9	5	7	0	-	0	-	5	3	5	3			
4	5	5	0	0	0	-	0	-	5	3	5	3			

**Significant at .01; f means frequency

cope with drought compared to 32% of the men whereas 68% of the men contacted more 2-4 extension agencies compared to 13% of the women. The analysis returned a significant difference between men and women ($\chi^2 = 44.314$, $df = 3$, $p < 0.001$) (Table 5b).

Perceived characteristics of information sources contacted for information to manage drought

Farmers' perceived communication behavior of fellow farmers

Overall, fellow farmers who were sources of information to cope with drought were perceived to be good communicators (91%), sharing information willingly (90%), providing information which can be easily used by either men or women (89%), and regularly shared information they had obtained from other sources (82%) (Table 6a). Results of the Mann-Whitney test showed significant differences in men and women perceptions of fellow farmers. These differences included the way they perceived farmers' ability to communicate well and convince others, willingly shared information, provided information that could be usable by men, and regularity of sharing information from various sources of information. Specifically, women perceived fellow farmers significantly more favorably than men in terms of being good communicators ($U = 7283.500$, $p = 0.027$); sharing information willingly ($U = 6951.000$, $p = 0.001$), having information that is usable by men ($U = 7120.500$, $p = 0.011$), and regularly sharing information from various sources ($U = 6961.000$, $p = 0.012$).

Farmers' perceptions of fellow farmers' farming experience and innovativeness

Men and women farmers were asked to describe the farming experiences and related innovativeness of the farmers from whom they obtained information to cope with drought (Table 7). The assessment was based on the fellow farmer being 'knowledgeable about farming', 'provided solutions to farming problems', 'experimented on farming practices', 'had exemplary fields', 'regularly used improved agricultural practices', 'quickly took on new agricultural technologies' and being 'a model farmer of improved agricultural practices. Over 80% of all men respondents indicated that they agreed that the fellow farmers possessed these attributes except in the aspect of fellow farmer quickly taking on new agricultural technologies (72%) and being a model farmer of local government extension program and NGOs (53%). Eighty-two percent (82%) of the women farmers agreed with the fact that the fellow farmers were knowledgeable about farming; 53% of the women farmers agreed with the fact that fellow farmer quickly took up new agricultural practices, while 42% agreed that these farmers who provided information were also model farmers of local government extension program or NGOs (Table 7a). The results of the Mann Whitney U test showed that women perceived fellow farmers significantly favorably and differently to men in aspects of coming up with solutions to farming problems

Table 6a. Assessment of men and women's perceptions of communication behavior of fellow farmers contacted

Aspects describing perceived Communication behaviour of the key farmers	Men (%) (n=128)			Women (%) (n=124)			Overall (%) (n=252)		
	A	NS	DA	A	NS	DA*	A	NS	DA
Communicates well & easily convinces someone	95	1	4	86	2	12	91	1	8
Willingly share information	96	0	4	84	5	11	90	2	8
Information usable by men	94	4	2	83	4	13	89	4	7
Information usable by women	91	3	6	83	5	12	87	4	9
Regularly shares information from other various sources	88	6	6	75	5	20	82	5	13

*A =agree, NS = not sure, DA =disagree. Following data analysis, strongly agree and agree were collapsed into the 'agree' (A) column, while strongly disagree and disagree were collapsed into the 'disagree' (DA) column. However, 'Not Sure' (NS) was not collapsed in the analysis on the basis that respondents being unsure could not be represented in either the Agree or Disagree column. They were coded as; 1= Agree, 2=Not Sure and 3=Disagree.

Table 6b. Tests of differences in men and women's perceptions of communication behavior of fellow farmers

Aspects describing perceived Communication behaviour of the key farmers	Men		Women		U	Z	P<.05
	Mean rank	Rank sums	Mean rank	Rank sums			
Communicates well & easily convinces someone	121.40	15539.50	131.76	16338.50	7283.500*	-2.217	.027
Willingly share information	118.80	15207.00	134.44	16671.00	6951.000**	-3.285	.001
Information usable by men	120.13	15376.50	133.08	16501.50	7120.500*	-2.546	.011
Information usable by women	121.40	15539.00	131.77	16339.00	7283.000	-1.954	.051
Regularly shares information from other various sources	118.88	15217.00	134.36	16661.00	6961.000*	-2.508	.012

*, **Significant at $\alpha = 0.05$ and $\alpha = 0.01$ probability levels respectively

Table 7a. Men and women's perceptions of farming experience and innovativeness of fellow farmers

Aspects describing perceived farming experience and innovativeness of the key farmers	Men (n=128) %			Women (n=124) %			Overall (n=252) %		
	A	NS	DA	A	NS	DA	A	NS	DA
Knowledgeable about farming	89	1	10	82	1	17	86	1	13
Makes solutions for farming problems	90	4	6	79	7	14	85	5	10
Experiments on farming practices	88	3	9	77	8	15	83	5	12
Fields are exemplary	88	2	10	73	7	20	81	4	15
Regular user of improved agric. Pracs.	81	4	15	70	8	22	76	6	18
Quickly takes on new agric. Techs	72	6	22	53	8	39	63	7	30
Model farmer of government extension / NGO	53	6	41	42	7	51	48	6	46

Legend: A =agree, NS= Not sure; DA =disagree

Table 7b. Mann-Whitney U test of Mean rank differences in farmer's perceptions on Farming experiences and innovativeness

Aspects describing perceived farming experience and innovativeness of the key farmers	Men		Women		U	Z	p ≤05
	Mean rank	Rank sums	Mean rank	Rank sums			
Knowledgeable about farming	121.82	15592.50	131.33	16285.50	7336.500	-1.689	.091
Makes solutions for farming problems	119.85	15340.50	133.37	16537.50	7084.500*	-2.342	.019
Experiments on farming practices	119.13	15249.00	134.10	16629.00	6993.000*	-2.469	.014
Fields are exemplary	117.45	15033.00	135.85	16845.00	6777.000**	-2.911	.004
Regular user of improved agric. Pracs.	119.86	15341.50	133.36	16536.50	7085.500*	-1.956	.050
Quickly takes on new agric. Techs	115.12	14735.00	138.25	17143.00	6479.000**	-2.959	.003
Model farmer of government extension / NGO	119.70	15228.00	133.58	16650.00	6972.000	-1.864	.062

*, **Significant at $\alpha=0.05$ and $\alpha=0.01$ probability levels respectively

($U=7084.500$, $p=0.019$), experimenting with farming practices ($U=6993.000$, $p=0.014$), having exemplary fields ($U=6777.000$, $p=0.004$), being regular users of agricultural practices ($U=7085.500$, $p=.050$) and in quickly taking up new agriculture techniques ($U=6479.000$, $p=0.003$) compared to men (Table 7b).

Farmers' perceptions of effectiveness of information obtained from fellow farmers

Farmers' perceptions of the effectiveness of information obtained from fellow farmers was based on 'usefulness of information', 'timeliness of information', 'affordability of information', 'accuracy of information', 'relevance of information' and 'ability of the information obtained to address the problem being faced'. Both men and women perceived fellow farmers to be highly effective in all the above aspects. Over 80% of both men and women agreed that fellow farmers were effective in all the above aspects, the only exception was their ability to solve problems, where about 70% of the men and the same proportion of women agreed to a lack of effectiveness in this attribute (Table 8a). The Mann Whitney U test revealed that women perceived the information obtained from the most contacted fellow farmer to be significantly more affordable compared to the men ($U=7367.500$, $p=0.024$), and the information obtained from the most contacted fellow farmers to be significantly more relevant as compared to the men ($U=6764.000$, $p=0.001$) (Table 8b).

Table 8a. Farmers' perceived effectiveness of information obtained from fellow farmers

Aspects of effectiveness	Men (%) (n=128)			Women (%) (n=124)			Overall (%) (n=252)		
	A	NS	DA	A	NS	DA	A	NS	DA
Usefulness	98	-	2	94	1	5	96	1	3
Timeliness	94	-	6	95	1	4	95	1	4
Affordability	97	2	1	90	1	9	94	2	4
Accuracy	95	1	4	90	1	9	93	1	6
Relevancy	98	-	2	84	3	13	91	2	7
Addresses problems	69	1	30	67	3	30	68	2	30

Legend: A =agree, NS= Not sure; DA =disagree

Farmers' perceptions of the effectiveness of information obtained from extension agencies

The assessment of the effectiveness of information obtained from extension agencies was based on farmers' perceptions of timeliness, relevance, usefulness, affordability, accuracy, and ability of the information to address all the farming problems that manifested as a result of drought. The respondents judged the extension agencies as having provided useful, accurate, affordable and relevant information. However,

Table 8b. Mann-Whitney U test of Men and women's perceptions of effectiveness of information obtained from fellow farmers

Aspects of effectiveness	Men		Women		U	Z	P≤05
	Mean rank	Rank sums	Mean rank	Rank sums			
Usefulness	123.96	15867.00	129.12	16011.00	7611.000	-1.748	.081
Timeliness	127.31	16296.00	125.66	15582.00	7832.000	-.453	.651
Affordability	122.06	15623.50	131.08	16254.50	7367.500*	-2.261	.024
Accuracy	122.91	15732.50	130.21	16145.50	7476.500	-1.736	.083
Relevancy	117.34	15020.00	135.95	16858.00	6764.000**	-4.140	.000
Addresses problems	124.44	15928.50	128.62	15949.50	7672.500	-.563	.574

*, **Significant at $\alpha=0.05$ and $\alpha=0.01$ probability levels respectively

aspects of timeliness of information, and ability of the information from extension agencies to address problems brought about by drought had the least score for men and women farmers (Table 9a). The findings of the Mann-Whitney *U* test highlight that women perceived the information obtained from extension agencies to be more relevant as compared to the men ($U=3264.500$, $p=.020$) (Table 9b).

Table 9a. Perceived effectiveness of information from extension agencies

Aspects describing information effectiveness	Men (%) (n=107)			Women (%) (n=71)			Overall (%) (n=178)		
	A	NS	DA	A	NS	DA	A	NS	DA
Usefulness	94	-	6	86	1	13	91	0.0	9
Timeliness	79	7	14	70	2	28	75	5	20
Affordability	84	6	10	78	5	17	81	6	13
Accuracy	86	1	13	86	3	11	86	2	12
Relevancy	87	5	8	72	4	24	81	5	14
Addresses problems	70	9	21	72	1	27	71	6	23

Legend: A = agree, NS = Not sure; DA = disagree

Discussion

The men and women farmers in Masindi district relied on a combination of good agricultural practices (GAP), including early land preparation, early planting, planting early maturing crops like beans, and drought-resistant crops to cope with drought, mainly based on the advice of fellow farmers. While there was a reliance on formal extension agencies like farmers' organizations and the district local government extension programs, this was by a smaller proportion of both men and women farmers.

Table 9b. Mann-Whitney U-test of farmers' perceptions of effectiveness of information obtained from extension agencies

Aspects describing effectiveness	Men		Women		U	Z	P _{≤05}
	Mean rank	Rank sums	Mean rank	Rank sums			
Usefulness	86.79	9286.50	93.58	6644.50	3508.500	-1.692	.091
Timeliness	86.88	9296.50	93.44	6634.50	3518.500	-1.115	.265
Affordability	87.27	9338.00	92.86	6593.00	3560.000	-1.048	.295
Accuracy	89.38	9564.00	89.68	6367.00	3786.000	-.062	.951
Relevancy	84.51	9042.50	97.02	6888.50	3264.500	-2.320	.020*
Addresses problems	90.90	9726.50	87.39	6204.50	3648.500	-.560	.575

*, **Significant at $\alpha = 0.05$ and $\alpha = 0.01$ probability levels respectively

This means that there is still reliance on local knowledge and information systems to deal with a serious climate challenge like drought. Mittal and Mehar (2013), and Bernard *et al.* (2014) showed that fellow farmers, friends and relatives were often useful sources of agricultural information to farmers. Indigenous local knowledge resources are quite useful (Filho *et al.*, 2023), however, there seems to be a greater reliance on the local systems than on the formal systems, yet the latter absorb more government investment. This speaks of the relevance of local information systems and the need to harness them to address drought challenges, by interfacing the formal systems with the local ones (Filho *et al.*, 2023), which might include supporting those locals that are depended upon with means to use more effective communication channels such as radio, television and social media, and involve them in formal extension activities (Gumucio *et al.*, 2020). This may need to have some reward or recognition systems attached to it.

Differences in men and women's use of information sources on coping with drought

Both men and women farmers relied more on fellow farmers for information to cope with drought, however, women relied on fellow farmers more than men. Contacting fellow farmers such as neighbors, relatives, and friends, can be easy, particularly the women, due to the sharing of the same social status and similar limitations (Kansiime *et al.*, 2021; Morrison *et al.*, 2025). The tendency to obtain information from fellow farmers may also be because fellow farmers are an inexpensive source of information. For example, meeting a fellow farmer within the community does not require transport. Also, farmers being neighbours and sharing the same environment with fellow farmers makes face-to-face contact easy as observed by Kansiime *et al.* (2021), and there is a lot of trust at that level. Farmers tend to have more confidence with their counterparts than with outsiders (Bwambale, 2015; Rust *et al.*, 2022). Less use of

extension workers speaks first to the low coverage of extension services, and lack of access to these services among the majority of ordinary farmers. Formal sources tend to have costs when it comes to attending meetings, and investing time and resources, but are also not easily accessible due to low numbers of extension workers (Okello *et al.*, 2023; Ledermann *et al.*, 2024).

Findings revealed that both men and women farmers relied on male fellow farmers as sources information. This may be because men have information as they have the opportunity to look for it, they often have a wider network, and have time to interact outside the home and community, unlike the women farmers who are restricted by social and reproductive activities including cooking and looking after households (Chaudhury *et al.*, 2012; Belay *et al.*, 2019). This is corroborated by Morrison *et al.* (2025) who found that most farmer-to-farmer extension efforts on dairy production rotated around men as the lead farmers and source of information. The present results show that men continue to leverage on their social status, the social and gender norms that structure men to have more power and rights to access information, mobility, credit, inputs and land. It confirms the fact they can access information easily than the women (Bergman Lodin *et al.*, 2019). There were more men with information to share than women, and it is also likely that the men fellow farmers had more credible information compared to the women.

As far as obtaining information from extension agencies was concerned, most of the respondents got information to cope with drought mainly from the farmers' organizations and the local government agricultural extension officers. Women relied on farmers' organizations more than men while the men equitably relied on both. This underscores the importance of farmers' organizations in reaching women farmers in such a district but reveals the persistent gap of local government extension services being of limited accessibility to women farmers, which echoes findings of Lecoutere *et al.* (2023). Interestingly, unlike in Soroti district, in eastern Uganda, where use of farmer organization was limiting for women (Kisauzi *et al.*, 2012), in the Masindi case, women found these more usable. Farmers' organizations can offer platforms for member ownership, participation, and access to information and can be accommodative for women farmers. Some of them have arrangements that enable easy access and also engender ownership and egalitarian values that increase the chances of members to harness the services they provide.

The advantages men had over women in accessing information from fellow farmers was also seen in the number of fellow farmers and extension services contacted. More men farmers contacted two or more fellow male farmers, and this was less so for women. Men thus consulted more farmers and different extension service categories compared to women. Having multiple sources to consult improves one's

chances to obtain a variety of helpful information, as well as to confirm certain recommendations, besides getting complete sets of required information (Mittal and Mehar, 2013). With the understanding that government sources have more authentic information, this might also put the women at a disadvantage. Lamontagne-Godwin *et al.* (2018) found women in Pakistan accessed much less variety and frequency of information from informal sources (fellow female farmers, neighbours, relatives, husbands) than men who obtained information from official or technical services such as extension services.

Farmers' perceptions of information sources contacted for information to cope with drought

Both men and women farmers perceived fellow farmers as being good communicators, sharing information willingly, having information that is usable, and sharing information regularly from various sources. However, women had a significantly more positive view of fellow farmers in the above attributes than the men. It is deduced that the communication attributes of farmers who influence other farmers are naturally good, with innate ability to convince others. Both men and women perceived the fellow farmers who provided information to cope with drought as 'knowledgeable about farming', 'provided solutions to farming problems', 'experimented on farming practices', 'had exemplary fields', 'regularly used improved agricultural practices', 'quickly took on new agricultural technologies' and were 'a model farmer in the use of improved agricultural practices. This speaks to the fact that there are farmers that know the right thing to do, and are willing to share with others. These farmers are recognizable to both men and women farmers. In the study, however, men perceived these attributes more than the women. Could it be that the women had a more honest assessment of fellow farmers than the men farmers? Overall, the farmers that were sources of information on how to cope with drought are those who were doing the right thing as far as farming was concerned.

The effectiveness of fellow farmers as sources of information for coping with drought was assessed favorably and it differed between men and women farmers. The assessment was in terms of 'usefulness of information', 'timeliness of information', 'affordability of information', 'accuracy of information', 'relevance of information' and 'ability of the information obtained to address the problem being faced'. Fellow farmers were, therefore, a reliable and dependable source of credible information at that level. Women farmers perceived the fellow farmers more favourably than the men. This may explain the level of reliance of women on fellow farmers; the level of confidence they had in them, the ease of access they have with them, and their affordability. There might also have been the element of greater trust by women on fellow farmers as sources of information on drought.

Conclusions

To cope with drought in Masindi district, both men and women farmers rely mainly on fellow farmers, often male ones, as a source of the information. More male fellow farmers are contacted for information than female ones. Farmers' organizations and local government extension were the next important source of information on coping with drought for the majority of the women and men farmers. Fellow farmers were perceived as great communicators, especially by women farmers, scoring well on willingness to share information, having information applicable to both men and women, and regularly sharing information. They are also perceived as knowledgeable about farming, able to solve farming problems, experimenters, exemplary, users of improved agricultural practices and technologies, and model farmers. The information obtained from fellow farmers to cope with drought was regarded as effective in terms of 'usefulness of information', 'timeliness of information', 'affordability of information', 'accuracy of information', 'relevance of information' and 'ability of the information obtained to address the problem being faced'. Female farmers perceived the information more favorably than the male farmers. The same pattern was expressed of the effectiveness of information from extension agencies. The contrast was that the proportions of women farmers who perceived the information from fellow farmers as effective was more than men, while the proportion of men who perceived the information from extension agencies as effective in coping with drought was more than that of the women. Therefore, gender disparities still exist, calling for greater investment in general education, preferably through farmers' organizations and other social groups to equip the fellow farmers who are still the most relied upon for information support.

Recommendation

There is a need to increase efforts to connect women to all types of sources of information to increase available options and enhance informed choice. Also, it is essential to identify reliable fellow farmers in such communities and create avenues to involve them in the formal extension systems as a move to reach more farmers in a gender responsive way. In addition, the extension agencies should increase their outreach activities with particular attention to gender-responsiveness.

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