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A GENDERED PERSPECTIVE ON THE FISH VALUE CHAIN, LIVELIHOOD PATTERNS AND COPING STRATEGIES UNDER CLIMATE CHANGE - INSIGHTS FROM MALAWI'S SMALL-SCALE FISHERIES

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ABSTRACT

In Malawi, fish is a form of livelihood to many poor people, despite fluctuations in catches. Female participation in natural resource activities, including fisheries improve livelihoods. However, female participation in Malawi fisheries has historically been low compared to their role in agriculture. In this article, gender roles in the fish value chain, livelihood patterns and gendered coping strategies in Malawi's small-scale fisheries under the effects of climate change were analysed. The analysis is based on interviews conducted on the western shores of Lake Malawi in two phases between January 2016 to June 2016 and June 2017 to July 2017. Qualitative and quantitative research methods were used to collect and analyse data from randomly sampled male and female household heads who own fishing gears and vessels. The study showed no significant differences between men and women in their perceptions of climate change in the last 30 years. The respondents' perceptions on ecosystem changes were significantly different for a number of trees and vegetation cover. However, there are significant differences on how male and female respondents perceived changes in fish catches and species composition. The statistically significant results showing differences between fish value chain activities and gender are attributed to the well-defined division of roles and responsibilities within Malawi fisheries. Respondents acknowledged the increased participation of women in grading, processing and selling fish in urban markets compared to the past. However, increased participation of women in fisheries was not due to perceived changes in climate but due to ownership of fishing gear and economic empowerment through development projects. Furthermore, this participation did not result in women having power to control or decide how to use fisheries related income. The study also shows women have a higher proportion of fisheries related monthly income than men. The main income sources are gendered and have changed in the last twenty years from heavily relying on agriculture to fisheries related sources. These changes could be attributed to climate related changes among other drivers. The study further observed significant differences in coping strategies between men and women attributed to households' social construction. Men ventured into fisheries and agriculture related initiatives while women were more into business initiatives. The findings suggest gender considerations regarding access to natural resources have implications on sustainable livelihoods. It is suggested that changes that transform gender relations should be put in place to improve women's ability to bargain.

Key words: Climate change, coping, fisheries, gender, livelihoods, Malawi, perceptions, value chain

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INTRODUCTION

Failure to consider gender in rural livelihoods increases vulnerability to climate-induced effects [1]. This vulnerability is socially produced and influenced by many factors including poverty, culture, political processes, place and time [2]. Exposure and sensitivity to such effects vary between men and women [3], and rural women suffer most because their livelihoods depend directly on ecosystems services [4]. One such ecosystem service is Malawi fisheries, where little is known about how men and women are affected by climate-induced vulnerabilities.

Malawi fisheries are a source of animal protein, especially for the majority of inhabitants who live in rural areas. In addition, fisheries contribute about 4% of Malawi's annual Gross Domestic Product (GDP) [5]. However, Malawians' fish consumption decreased by 60% between the 1970s and 2015 due to low fish catches [5]. Low fish catches are attributed to overfishing caused by population increase [6] and climate related events [7], among other factors. Despite this effect on fishers' livelihoods, women's participation in natural resource activities improves household incomes and food security [8].

Women and men often interact with different parts of the fisheries' ecosystem [9]. Women take part in many fisheries related activities, but their contribution is often invisible because they consider the work as part of their traditional home duties [10]. This results in gender-biased perceptions that reinforce the male-dominant vision of fisheries [11]. Therefore, without a complete understanding of the complexity of gender roles, sustainable livelihoods cannot be achieved. For example, the lack of documentation of women's roles in fisheries leads to policies biased towards solving male-oriented overfishing problems at the expense of policies that create sustainable livelihoods at the community level [12].

The role of women in Malawian fisheries is not as properly documented as their roles in agriculture [13]. Within the fish value chain in Malawi, women dominate low value (sun-dried) fish products for smaller species, while men dominate high value products like smoked large fish species [14]. Smoking adds more value to fish products compared to sun dried [ibid]. Furthermore, gender relations and fish catch fluctuations have received little attention in areas where climate related impacts are recurrent [15].

Fluctuating fish catches affect livelihoods for women and men [3]. Therefore, if sustainable resource management and community well-being are to be maintained, men and women must be mobilized together. Women have unique knowledge and skills, which add value in responding to effects of climate change more effectively and sustainably [16]. This article seeks to analyse gender roles in the fish value chain, livelihoods patterns and coping strategies in Malawi's small-scale fisheries under the effects of climate change. The study aims to provide knowledge to inform policies and interventions that can improve sustainable livelihoods of Malawi fishers. The research explored the following questions: i). do women and men in fishing communities perceive changes in weather trends and the ecosystem differently?, ii). do women and men perceive changes in fish catches and species composition differently?, iii). to what extent can changing gender roles in the fish value chain be attributed to climate change?, iv).

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has a shift in household livelihoods been observed over the past 20 years?, and v). do women and men in fishing communities employ different strategies to cope with climate change?

MATERIALS AND METHODS

Study area and data collection

This study was conducted in the Nkhotakota district on the western shores of Lake Malawi between Global Positioning System (GPS) Coordinates: 12°37'40.5"S 34°10'32.2''E and 12°37'40.5''S 34°10'32.2''E (Figure 1), from January 2016 to June 2016 and from June 2017 to July 2017. The study site was chosen because it is exposed to environment-induced effects and is also a priority area for the implementation of the National Adaptation Plan of Action (NAPA) on climate change [17]. Nkhotakota's fishers make up 14% of the total small-scale fishers of Malawi with women owning 2% of the total fishing gear [18].

In order to explore the research questions, we combined qualitative and quantitative research approaches. Prior to detailed household surveys; exploratory surveys, participatory and field observations were conducted to contextualize the study. Through these processes, research tools (household survey questionnaire, checklists for focus group discussions and key informant interviews) were developed and pre-tested for consistency. Furthermore, consent to conduct the study was granted by both village chiefs and respondents. The study randomly sampled household heads from families who owned either a fishing gear or a vessel. The lists on which random sampling was based were retrieved from local fisheries management committees. Validity and reliability of the household surveys were also strengthened by conducting five (5) sets of focus group discussions (FGDs) and key informant interviews (KIIs) as a follow- up to the key outcomes from the household survey. Each FGD was comprised of a group of 10 women and men of mixed ages who were interviewed separately and later combined to ensure unbiased responses. The KIIs included fishers (gear owners and crew members), sellers, District Assembly officials, chiefs and local fisheries management committee members.

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Figure 1: Map of Malawi showing Nkhotakota district and the study area

Data analysis

The household concept, despite its weakness in not accounting for intra-household differences in gender studies, was used as a unit of analysis because fishing gears were mostly owned by household heads. This concept guided analysis of responses from the research questions. Furthermore, it strengthened the application of the Harvard Analytical Framework (HAF) in determining gender roles. The HAF is part of a broader framework of Gender and Development (GAD) [19]. This study concentrated on gender roles which included: who does what, who does it most, who is most experienced in that activity and who has access to and control of the benefits from fishing related activities. The framework further provided a platform to analyze power relations between women and men on different fish value chain activities.

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Qualitative data was analysed using content analysis for related themes. Direct quotations were used to explain, support and clarify important issues observed by the respondents. Descriptive statistics (means, ranges, frequencies and proportions) were analysed using IBM SPSS Statistics 24 and Stata version 14.2. Cross tabulations were used to determine statistical relationships of several household characteristics (marital status, kinship, religion, tribal affiliation, perceptions on climate change and fish catches, gender roles, income sources and coping strategies) between men and women respondents. The study also used an independent sample t-test to compare experience associated with fishing related activities, total fisheries incomes and the proportion (%) of fisheries-related total monthly income between men and women respondents.

RESULTS AND DISCUSSION

Characteristics of study respondents

The study randomly sampled 113 households with a respective 65% and 35% of male and female respondents. A full description of the respondents' characteristics is shown in Table 1. The mean ages for men and women were 39.8 and 39.4 years old, respectively. The respondents' age ranged as from 20 to 64 years for men and from 21 to 94 years for women. The statistically significant ($t\ (12.76) = 4.6,\ p = 0.00$) average time in years the households had been involved in fishing-related activities for men and women respondents were 16.4 and 7.4 years, respectively. Although these results suggest men have been involved in fishing related activities for a longer time than women, the higher age range for women suggests no age restrictions in conducting fisheries-related activities.

The study revealed the majority of respondents (men and women) had formal education and were married. There were significant differences ($\chi^2 = 19.59,\ df = 4,\ p = 0.001$) between the marital status of men and women. The higher proportion of married men (89%) compared to women (60%) could be caused by a higher level of divorce for women (18%) than men (0%). Furthermore, single or divorced women are also more likely to go into occupations not traditional for women, than married women.

The results also showed significant differences ($\chi^2 = 9.67,\ df = 1,\ p<0.05$) between kinship (patrilineal and matrilineal) of men and women respondents. Table 1 shows the majority of women (74%) were from matrilineal kinship compared to 58% of men. These results confirm the standard norm in the study area, which is that Chewa is dominated by and follows matrilineal settings. The Chewa tribe domination (69%) was confirmed from sampled households, while other tribes (Tumbuka, Tonga, Yao, Lhomwe and Ngoni) were a small proportion. These findings could also reflect possibilities of intermarriages with patrilineal tribes like the Tonga and Tumbuka who migrated to the study area [20]. Furthermore, there was a significant difference between tribal affiliation and religion ($\chi^2 = 34.12,\ df = 6,\ p<0.001$). These findings suggest that religious affiliation influences tribal tenets [21], which result in socially-constructed roles, and has major implications on power relations within households.

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Table 2 summarizes ownership of major capital assets for respondents. Even though it was easy to access land in the study area [22], the study showed that half of the respondents (51%) did not own a house or land but rented a house and agricultural land. This could indicate temporary residence as some respondents (53%) had migrated to the area.

The households also owned other assets like bicycles (62%) and an ox cart (1%). The bicycle mode of transport in the study area eases mobility challenges that are known to affect livelihoods of women and girls [23]. The majority (95%) of respondents had no electricity. Regardless, some (19%) respondents owned assets like television sets, which require electricity for operation. Ownership of television sets could be attributed to the increase in solar energy use.

Do women and men perceive changes in the weather trends and the ecosystem differently?

The majority (>90%) of respondents reported experiencing significant changes in temperature and rainfall (Figure 2). These changes include increased incidences of extreme hot temperatures, late onset of and erratic rainfall, floods and droughts. However, there were no statistical significance differences ($\chi^2 = 453$, $df = 1$, $p > 0.05$), between men and women's perceptions of these changes in the last 30 years.

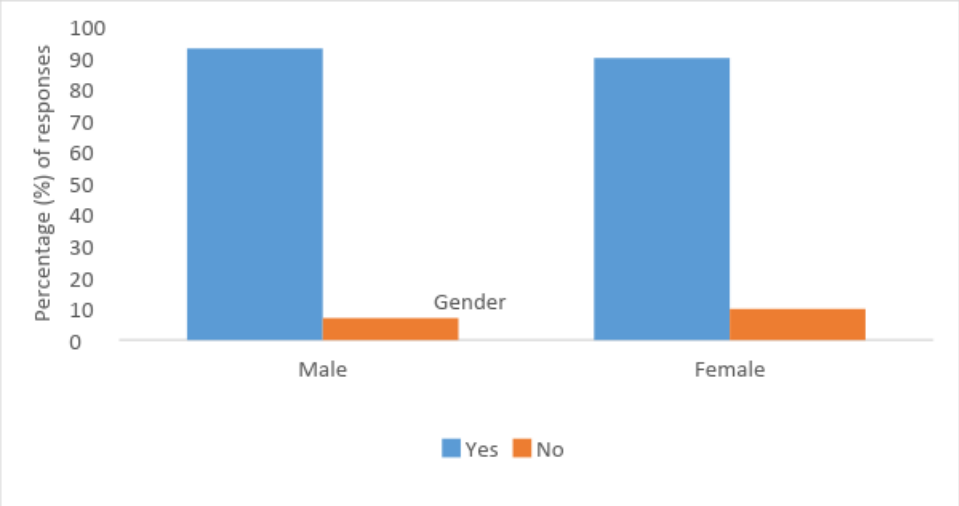

Figure 2: Respondents' perceived changes in weather patterns by sex over the last 30 years

The perceptions of respondents were based on their experiences of long-term weather exposure in the last 30 years [24]. The high average age of respondents (39 years) provided a good platform to support having experienced such changes by reducing challenges, which arise when people interpret trends from a few recent events [25]. Even though age is a good indicator for experiencing exposure to the changes, perceptions are furthermore influenced by the ability to recall and define these incidences using lived experiences as a baseline for comparison [26].

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Table 3 shows frequency of droughts and floods in the study area over the last 30 years. The majority of respondents (>90%) acknowledged that the rainfall pattern had been erratic resulting in extreme high temperatures. This could be as a result of Malawi's monthly precipitation pattern, which has been unstable with increased frequencies of inter-annual variabilities [27]. About half of the respondents had witnessed less than three (3) drought incidents attributed to low precipitation, whereas the other half had not witnessed any flooding event. There were no statistically significant differences between respondents' sex and the perceived number of droughts and floods.

The perceived ecosystem changes in the study area are broadly summarized in Table 4. The majority of respondents (men and women) acknowledged significant ecosystem changes in beach size, number of trees, number of reeds, wetland size, river flow, river size and vegetation cover. Furthermore, men and women respondents perceived vegetation cover changes ($\chi^2 = 3.2, df = 1, p<0.01$) and the extent to which the number of trees had changed ($\chi^2 = 11.07, df = 2, p<0.001$) differently. The women's perceptions could be a reflection of knowledge gained by travelling long distances to collect firewood for cooking. Beach size increase suggested low water levels in Lake Malawi. The number of trees, vegetation, reeds, wetlands size, river flow and size had also decreased. However, low precipitation and extreme hot temperatures were perceived by the households to be the main driver of such changes. Additionally, these changes have implications on the livelihoods of fishers [4].

These results also reflect some responses regarding ecosystem changes given during a focus group discussion of men and women: *"Where we are sitting right now and where we built our houses used to be part of Lake Malawi but now it is all dry."* (Group discussion with author, Site #1, 2017).

Do women and men perceive changes in fish catches and species composition differently?

The study showed that the majority (99%) of respondents reported poor fish catches in the last 16 years. Some male respondents (63%) reported decreased probability of catching some fish species compared to 84% of the female respondents. There are statistically significant differences ($\chi^2 = 4.631, df = 1, p<0.05$) between men and women's perceptions with regard to poor fish catches in the study area. These differences could be attributed to different species preferences because catching fish is mostly a male job, while women commonly sell or consume and might not know as much about fish species [12].

The most common fish species in the area used to be *Copadichromis virginalis*, *Engraulicypris sardella and Oreochromis.* Among these three fish species, respondents ranked *Engraulicypris sardella* and *Copadichromis virginalis* as the most important fish species of today for food and income, whereas *Oreochromis species* were rarely caught. Furthermore, respondents cited an increase in illegal fishing gears, migration of fish to offshore areas, and drought incidents as some reasons for low fish catches. Climate-related factors like rainfall affect fish catches because turbid waters from rainfall provide food to fish and also hinder fish's visibility from any possible fishing traps and nets [28].

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The responses of men and women from another focus group discussion on effects of extreme weather events on fish availability highlighted how low catches could be attributed to climate related factors: "*We are challenged by droughts, up to the extent of skipping meals some days. We have the lake nearby but even to catch the fish is not easy because catching more fish is a factor of getting a lot of rain."* (Group discussion to author, Site #2, 2016).

To what extent can changing gender roles in fisheries be attributed to climate change?

Results from the study show the three important fish species in the study area have a similar value chain. This supports previous results [14] and could be attributed to the number of times these activities are done. Fish value chain activities like identification of fishing grounds, buying nets, boats and fuel, identification of fishing crew and catching fish were male dominated, while women dominated fish post-harvest activities (Table 5). There were statistically significant differences ($\chi 2 = 38.87$, $df = 4$, $p<0.0001$) between fish value chain activities and respondents' sex. This may suggest well-defined division of gender roles in fisheries [29], which are guided by social-cultural institutions [11, 12].

In general, respondents acknowledged increased participation of women in fish grading (33%), selling (48%), processing (50%) and selling in urban markets (33%) compared to the past. The study further provides evidence that transformation of gender roles in the fish value chain were not due to perceived changes in climate ($p>0.05$). Instead, the general participation of women in fisheries could be attributed to ownership of fishing equipment [30] and empowerment activities by many projects promoting women's leadership roles in economic activities [31]. Even though female participation increased overall, their participation in giving advice to their employed fishing crew on potential fishing grounds (2%), buying fuel for fishing boats (1%) and recruiting fishing crew (0%) remained low.

Here is a response on participation of women in fisheries given during a key informant interview by a female fish trader: *"Now things have changed, I thought I was helping my husband to supplement money for our better lives. Now his money is for his own things and mine is for supporting the family. Our involvement in fisheries is due to economic empowerment in order to support our households and has nothing to do with climate change."* (Interview with a female fish trader to author, Site # 3, 2017).

Table 6 shows the implications of women's participation in fisheries. These include improved socio-economic status of their households and more women were now part of the local fisheries management committees. The participation also increased transactional sex for the women as cited by 10% of the men. Another implication was failure of women to control and decide how to use income from fisheries-related activities. The lack of power could be a result of intermarriages between migrants of patriarchal origin to matrilineal locals [20]. Gender power relations in most traditional African societies have patriarchal underpinnings [32].

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Has a shift in household livelihoods been observed in the last 20 years?
Table 7 summarizes the mean monthly fisheries income and its proportion to total household income. Income differences were statistically significant ($t\ (20) = 2.5,\ p<0.05$) between men and women. A higher proportion of income came from fisheries-related activities for women (76-91%) than men (63-69%). Income from selling of fish is important throughout the year, particularly for women.

Results indicate differences in fish selling locations. Most male respondents (78%) sold their fresh fish at landing sites to processors and traders. These results suggest men were eager to reduce waiting time of selling fish before returning to the water for another fishing round. Women sold their fish within village markets (27%), district markets (30%) and urban markets (30%) as dried (60%), smoked (16%) and fried (12%) goods. Women preferred to sell their fish in urban markets due to low prices in the village and district markets. This is similar for women in agriculture who have responded to low selling prices of their farm produce by selling at distant urban markets [32].

Table 8 shows that main income sources had changed in the last twenty years. There are statistically significant differences $(\chi 2= 7.9,\ df = 4,\ p<0.1)$ between perceived changes in climate and household income sources for the last 20 years. Respondents no longer rely as heavily on agriculture-based incomes as they did twenty years ago. These changes could be attributed to low agricultural productivity. Fisheries offered an easy alternative because of proximity to the open access lake [33]. These results might suggest climate as a main driver for changes in income source.

There were also statistically significant differences between income sources (current or 20 years ago) and respondents' sex, suggesting income sources to be gendered. For example, between 1996 and 2016, more women were selling food crops compared to selling fish. Whereas the majority of men used to be casual employees in fisheries in the past but now, they were owners of fishing gears and vessels.

Do women and men employ different strategies to cope with climate change?
Table 9 shows how the majority of respondents diversify livelihoods due to low fish catches. Even though households indicated a shift from agriculture to fisheries as the income source, more men than women are involved in agriculture as a livelihood diversification measure. These shifts by respondents suggest circular patterns [34] as livelihoods seem to revolve around fisheries, agriculture and businesses (Table 8). Half of the women (50%) and 20% of the men were migrating to other fishing areas. Surprisingly, women who do not have power and control over household income are allowed by their husbands to migrate between fishing sites to buy fish for resale. This behaviour could be driven by dominant control of men over women's earnings [35]. However, 20% of men who did not migrate to other fishing sites coped by intensifying offshore fishing. Migrating to other fishing areas is a good coping strategy [36], which also provides time for fish stocks to rejuvenate [37]. However, migration increases competition between fishers and this affects sustainability of the fishery [38]. Women also used group coping strategies like Village Saving Loans (VSLs). Coping with changes as a group is common for women [29] since it improves their bargaining power [3]. Having many coping strategies and flexibility between which to switch suggest opportunistic behaviour, which could lead to unsustainable natural resources use [39].

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The difference in coping strategies between men and women was statistically significant *($\chi 2$, $p<0.001$),* suggesting coping strategies are gendered. This could be attributed to the adaptive nature of men and women, which is associated with cultural norms [40].

During a men's focus group discussions on their coping strategies, the following was stated to support the results from the household survey: "*We have improved our coping to the changes by using illegal fishing gears and providing labour to upland farms and while at the same time increasing the price of the fish."* (Group discussion to author, Site # 4, 2016).

CONCLUSION

Gender consideration is an important social aspect to achieving sustainable livelihoods. Thus, a study to analyse gender roles in fish value chain, livelihoods patterns and coping strategies under climate change in small-scale fisheries of Malawi was conducted.

The study has revealed that men and women had similar perceptions to common extreme weather events in the study area. The extreme weather events were hot temperatures, late onset and erratic precipitation, floods and droughts. Yet men and women's perceptions on ecosystem changes like the number of trees and vegetation cover differed.

The impacts of the perceived extreme weather events between men and women included decreased fish catches. The changes in climate, however, did not influence the increase of women's participation in fish grading, processing and selling fish in urban markets. The women's participation was attributed to increased investment in fisheries related activities. The participation of women in fisheries related activities did not result in them having power to control assets and benefits from fisheries. Their participation, however, resulted into improved household welfare concerning food and income security. Due to the participation of women in fisheries related activities, more women were also incorporated in the local fisheries governing structures than in the past.

The study further noted a shift in livelihood patterns during the last 20 years from agricultural to fisheries and the shift was significantly different between men and women. In the last 20 years, that is between 1996 and 2016 more women were selling food crops compared to fisheries related activities. During the same period, men who used to do agricultural related activities and working in fisheries as casual laborers, were now doing less agricultural related activities compared to fishing. These changes might be a reflection of how agricultural productivity was affected by changes related to climate.

Despite such shifts in livelihoods, men and women also coped with the low fish catches differently. Women's strategies were more business oriented than men who were oriented towards agriculture and fisheries. Additionally, coping also created a platform for equated division of labour within households, especially when women travel to other fish landing sites and markets far away from their homesteads.

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The findings are important in implementing gender inclusive policies related to livelihood improvement and coping with fluctuating natural resources. This study provides an overview on how livelihood coping strategies can be mainstreamed in policies without losing focus of the different roles men and women play. Furthermore, these policies can be strengthened by validating local perceptions on climate change and fish catches with conventional scientific knowledge.

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ajfand SCHOLARLY, PEER REVIEWED AFRICAN JOURNAL OF FOOD, AGRICULTURE, NUTRITION AND DEVELOPMENT Volume 18 No. 2 August 2018 PUBLISHED BY AFRICAN SCHOLARLY SCIENCE COMMUNICATIONS TRUST ISSN 1684 5374

Table 1: Household characteristics of the respondents (N=113)

Characteristic		Male %	Female %
Marital Status	Married	89	60.0
	Single	5.5	5.0
	Widowed	4.1	15.0
	Co-habiting	1.4	2.5
	Divorced	0	17.5
Education level	No formal	12.3	22.5
	Primary	56.2	62.5
	Secondary	31.5	15.0
Main income source	Agriculture	5.4	2.5
	Fishing	90.4	87.5
	Business	2.7	10.0
Kinship	Patrilineal	58.0	25.7
	Matrilineal	42.0	74.3
Religion	Muslim	50.7	55.0
	Christian	47.9	45.0

Table 2: Major capital assets for the households (N=113)

Characteristic		**Frequency**	**Percent (%)**
House ownership	Yes	55	49
	No	58	51
Type of house	Brick grass thatched	53	47
	Brick iron thatched	43	38
	Mud grass thatched	15	13
Ox cart	Yes	1	1
	No	112	99
Bicycle ownership	Yes	70	62
	None	43	38
Cellphone ownership	Yes	83	73
	None	30	27
Television ownership	Yes	21	19
	None	92	81
Access to electricity	Yes	6	5
	None	107	95
Solar panel ownership	Yes	16	14
	None	89	79

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Table 3: Perceived proportion (%) for frequency of floods and droughts incidences observed in the last 30 years by the respondents (N=113)

	Droughts		Floods	
Frequency	**Male**	**Female**	**Male**	**Female**
< 3 times	54.4	55.3	46.6	50
4 – 6 times	14.7	5.3	10.3	7.1
> 6 times	13.2	26.3	8.6	0
never witnessed	17.6	13.2	34.5	42.9

Table 4: Proportions (%) of perceived ecosystem changes in the last 30 years by the respondents in Nkhotakota (N=113)

Changes	**Degree of change**		
	Increased	Decreased	Same
Beach size	64.3	24.1	11.6
Number of tress	16.1	77.7	6.3
Reeds	12.6	78.4	8.1
Wetland size	13.9	72.2	13.9
River flow	7.3	79.1	13.6
River size	4.5	84.5	10.9
Vegetation	2.7	86.6	10.7
Fish kills	1.0	86.7	13.3

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Table 5: Nkhotakota fish value chain, roles, access and control of resource for men and women on *Copadichromis virginalis*, *Engraulicypris sadella and Oreochromis spp.* fish species (N=113)

Gender role	Who does it most?			Most knowledgeable in the activity			Changes to who was doing it in the past.		Frequency of activity
Fish value chain activity	Male (%)	Female (%)	Male & Female (%)	Male (%)	Female (%)	Male & Female (%)	Yes (%)	No (%)	
Identification of fishing grounds	98	2	0	100	0	0	0	100	Everyday
Buying of fishing nets	99	1	0	100	0	0	10	90	When worn out
Buying of fishing vessels	97	1	2	99	0	1	9	91	When worn out
Buying of fuel for fishing vessels	98	1	1	97	0	3	4	96	Everyday
Identification of fishing crew	99	0	1	99	0	1	0	100	Everyday
Catching of fish	99	0	1	99	0	1	0	100	Everyday
Grading of fish	59	20	21	65	14	21	33	67	Everyday
Selling of fish	35	42	23	36	34	30	48	52	Everyday
Processing of fish	20	54	26	21	48	31	50	50	Everyday
Selling fish to urban markets	30	45	25	24	41	35	33	67	Everyday
Who has the right to use the catch?	72	14	14	78	8	14	8	92	Everyday
Who controls the money from fish sales?	85	9	6	83	10	7	5	95	Everyday
Who decides how much to use?	80	15	5	82	12	6	6	94	Everyday

Table 6: Proportions (%) of perceptions on implications of women's participation in fisheries by the respondents

Implications of women participation in fisheries	Male	Female	Total
Increase in sexual behaviour	6	0	6
Increased joint control of resources	4	0	4
Increased demand for fish than in the past	4	0	4
Improved social economic status	13	12	26
More women in fisheries management	19	12	31
More women in fish processing and selling	7	2	9
Increased control of resources by women	7	3	10
Increase in destabilization of families	1	0	1
No control of resources	3	6	9
Total (%)	**65**	**35**	**100**

Note: N=113. Cross tabulations: $\chi^2 = 18.88$, $df = 8$, $p = 0.016$

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Table 7: Nkhotakota female and male monthly fisheries income (US$) and its proportions (%) from the total household income for the period June 2015 to April 2016 (N=113)

	Female		Male	
Month	Mean Fisheries Income (US$)	Proportion of total Income from fish (%)	Mean Fisheries Income (US$)	Proportion of total Income from fish (%)
June	53.7	90.00	115.8	65.44
July	44.0	91.15	73.2	68.64
August	86.5	89.00	80.2	68.78
September	66.3	87.67	72.3	68.15
October	70.1	86.75	80.3	68.38
November	63.8	82.07	83.0	66.29
December	85.1	76.13	84.3	68.62
January	61.2	86.25	68.9	65.47
February	54.5	83.85	65.8	64.03
March	37.3	77.00	60.8	62.90
April	46.2	86.50	65.0	63.23

Exchange rate: 1US$ = MK 733 as at March 2017

Table 8: Comparison of income sources in 2016 (current) and 20 years ago by men and women (N=113)

Income source	Current (2016)		20 years ago	
	Male (%)	Female (%)	Male (%)	Female (%)
Sale of fish	70	75.0	17.8	12.5
casual employment in fisheries	4	0	32.9	0
Sale of food crops	15	7.5	11.0	42.5
Sale of cash crops	3	7.5	0	5.0
Sale of livestock	0	2.5	0	0
Sale of livestock products	0	2.5	0	0
Business	3	3	0	0
Casual employment in farming activities	5	2	2.7	0
Under aged respondents who were under 20 years ago	-	-	35.6	40.0
Total (%)	**100**	**100.0**	**100.0**	**100.0**

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Table 9: Female and male respondents coping strategies to low fish catches (N=113)

Coping strategy	Female (%)	Male (%)
Selling fish to upland markets	2.0	14.0
Village Saving Loans (VSL)	10.0	-
Agriculture	5.0	14.0
Casual labour	8.0	11.0
Petty businesses	18.0	4.0
Did not adapt	6.2	5.0
Circular migration to other fishing areas	50.0	20.0
Food rationing	1.0	-
Offshore fishing	-	20.0

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