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Inclusive Ecosystems? Women's Participation in the Aquatic Ecosystem of Lake Malawi

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Abstract: Ecosystem services and their role in alleviating poverty are centered on a set of gendered social relations. The understanding of these relations between men and women in aquatic ecosystems can unveil gender-based opportunities and constraints along the value chains of the ecosystem services. A gender discourse perspective on participation of actors of an ecosystem can further facilitate the understanding of the complex and subtle ways in which gender is represented, constructed, and contested. This paper analyses the barriers to the participation of women in the fishing industry. The analysis is based on a study conducted in five fishing villages of Lake Malawi through a structured questionnaire, focus group discussions, key informant interviews, and observations. First, it looks at gender and participation from a theoretical perspective to explain how gender manifests itself in participation and interrogates why women have limited benefits from the fishing industry. Second, it highlights the barriers that seem to preclude women from participating, which include institutional embedded norms, financial, socio-cultural, and reproduction roles. In general, women had little influence on the type of fishing sites, markets, and access to financing of their businesses. A gender transformative agenda is therefore required to proactively facilitate changes of some entrenched institutional norms as well as having greater access to financial services and new technologies in order to enhance women's full participation and equal benefits from ecosystem services.

Keywords: decision-making; ecosystem; fisheries; gender; participation

1. Introduction

Gender is a socially constructed phenomenon, which can unravel the hidden norms and power relations existing in socio-ecosystems. Gender differences tend to exist because of how society views the intricacies of behaviors, which seem embedded in individuals with respect to gender roles in a particular socio-ecosystem. Brown and Fortnam [1] report that gender is a critical determinant of how people benefit from ecosystems differently, and the absence of gender perspectives makes ecosystem-service frameworks weakly aligned with the central concerns of global development around equity, justice, knowledge, and voice. Socio-ecosystems generate important ecosystem services while accounting for the human dimension that shapes and is shaped by its nature [2]. Several scholars [3,4] posit that society and culture create gender roles that are assumed to be ideal and acceptable by the people in a particular socio-ecosystem, and subsequently shape the behavior of its individuals. The aquatic socio-ecosystem in particular, combines the natural productivity of water, vegetation, and aquatic wildlife especially fish whose value chains employ millions of people. In Malawi over two million people are employed or directly benefit from the fish value chain [5].

Women in Southern Lake Malawi have diverse and distinct work at both community and household levels particularly the home production activities and non-paying productive work. Thus women will attend to household chores, attend to children and the elderly if any, and care for the sick. This renders women unable to attend to their businesses or participate in community development activities or projects.

The expected household chores should be viewed from the perspective of gender roles and division of labor. Labor roles and responsibilities are culturally defined and vary from context to context. More often than not, women are expected to be responsible for water and fuel wood fetching, child care, caring for the sick and the elderly, and food preparation while being expected to contribute even higher inputs to agricultural labor [6]. These perceived gender roles not only increase women's work load, but they also limit their participation in profitable fisheries businesses. Gender norms in the fishing industry further restrict women's access to training, non-labor inputs, and markets. Despite their significant contribution to fisheries, women face so many gender-related challenges [7–9]. Women are not represented in community fishing management committees and they do not access training, credit, and other resources related to production. Women participation in fishing is typically characterized by mixed and dynamic temporal engagement [10]. Their participations at times is largely a "self-initiated" and a seasonal activity especially during hunger seasons in order to provide for the family [11].

In the aquatic ecosystem, the human interaction during fishing, processing and marketing of fish is complex and affects women's effective participation in the value chains. The fish value chain in Malawi starts from fishing to processing, transportation, and marketing. The involvement of men and women in the fish value chain varies depending on economics, politics, and culture. Fishing and fish trading are mostly done by men while fish processing is done by both men and women with women dominating the drying of small pelagics. Men are thus involved in higher value adding processing activities than women. Selling of firewood for fish processing is mostly done by women while transportation of fish is mostly done by men who either drive vehicles to various destinations or paddle boats on behalf of fish buyers [12].

To promote women participation in the fisheries sector, gender mainstreaming has become a requirement of most state and non-state programs. For example, the government of Malawi launched the new National Gender Policy in 2015 [6]. The policy is a strategic guide with the goal of mainstreaming gender in the national development processes to enhance the participation of women, men, boys, and girls in sustainable and equitable development. The policy was developed as an integral part of Malawi's development objectives, which were intended to enhance the overall government growth strategy in poverty eradication. The recent developed Sustainable Development Goals (SDGs) also emphasize gender equality and empowerment of women, by providing women and girls equal access to education, health, employment, as well as representation in political and decision-making processes. The global policy orientation articulated through Agenda 2030 also seeks to 'leave no-one behind' based on social differences and, in particular, gender. However, in many cases gender mainstreaming does not necessarily address the power relations that disadvantage women from influencing change [13]. The foregoing provides a basis for analyzing gender-based barriers in aquatic ecosystems to establish gender-based opportunities and constraints particularly along the fisheries value chains [14–16]. For example, while gendered social relations are barriers to women in accessing ecosystem services such as fresh fish, and may render them vulnerable, they may also provide women with opportunities such as controlling markets of processed fish.

Understanding Gender and Participation

Ecosystem services and their role in alleviating poverty are a set of gendered social relations, as such there are gender disparities that are prevalent in decision making related to utilization of these services. Participation in decision making related to ecosystem services and conservation is determined by the actors' interests in utilization, enjoyment, and valuation. This is because

participation allows for knowledge sharing, social learning, cogenerating preferences, and in the end making better and informed decisions [17]. While decision-making processes affect the provision of ecosystems services, there are also gaps in gendered knowledge, preferences, risk taking, and access to innovations [18]. It is now established that the differences in socio-cultural perceptions between men and women have resulted in widened participation and hence varied benefits from merely presence and representation in decision-making. It requires rigorous engagement and deep exploration of the conditions under which the greater involvement of women in fisheries value chains can improve the livelihoods of women [19]. Participation according to Agarwal [19], is characterized by inclusiveness in decision-making and collective involvement of people. Agarwal continues to suggest that participation is governed by the rules and regulations as well as perceptions. Equity is another driving force of participation, and Agarwal discusses the benefits and constraints arising from participation. For example, decision-making, power, and control of fisheries resources would influence choices and how women spend the incomes accrued from their businesses.

In this paper, participation centers on the devolution of power and the daily livelihood engagements of communities and in this regard, women's planning of their destinies. Participation is not only attendance at meetings but also critically analyzing issues and questioning certain actions and decisions. A gender discourse perspective on participation of actors of an ecosystem can therefore facilitate the understanding of the complex and subtle ways in which gender is represented, constructed and contested. A discourse perspective describes what is said about women in the fisheries sector and how it is said. Analyzing gender discourses will indicate attitudes, beliefs, behaviors, and power relations between men and women in order to construct social reality. Gender discourses include language, actions, interactions, values, beliefs, feelings, non-linguistic symbols, clothes, tools, objects as well as time and place dimensions and can be obtained through ethnographic observations, survey questionnaires, and analyses of text and talks [20].

2. Materials and Methods

2.1. Study Site and Background

Data for this paper were obtained from the central and southern parts of Lake Malawi. In the study, individual fishers, processors, traders, and transporters in the fishing villages of Lifuwu and Chikombe from Salima District and Malembo, Msaka, and Madzedze from Mangochi District were interviewed on various issues pertaining to fishing as an industry. These districts were chosen because they are very active in artisanal fishing with generally more women getting involved in the fish value chain. The villages were also targeted by the project "Improved Processing and Marketing of Healthy Fish Products in Malawi" from 2015 to 2017. The project was funded by the Australian International Food Security Centre (ACIAR) and the International Development Research Centre (IDRC) through the Cultivate Africa's Future (CultiAF) program whose objective was to enhance food and income security through improved processing and marketing of healthy fish products in inland fisheries.

Lake Malawi is a large freshwater water mass in southern Africa with a surface area of about 29,000 km^2, and a length of about 700 km. The lake's catchment covers about 130,000 km^2 and includes much of the east of Malawi, the south-western corner of Tanzania and the north-western corner of Mozambique (Figure 1). Lake Malawi lies in the Great Rift Valley system of Africa. It is very deep (The deepest part reaching about 800 m) and has varying landforms ranging from extensive plains, particularly in the south, to steep-sided mountains in the north. The water of the lake provides a habitat to 15% of the world's freshwater fish species [21]. Lake Malawi has a very rich biodiversity with over 800 fish species, most of them endemic to the lake. It is regarded as one of the world's important freshwater lakes and was declared a world heritage site in 1984. Lake Malawi and its catchment is a source of livelihoods to many Malawians. The lake itself provides over 90% of fish supply in Malawi which contributes over 70% of the total animal protein supply in Malawi [5].

2.2. Research Methods and Data Analysis

The primary data collection used multiple methods: individual questionnaire surveys, focus group discussions (FGD), in-depth semi-structured interviews with key informants, and direct observation. Two complementary panel data sets were collected in 2015 and 2017 using same data collection tools. Questionnaires were administered to 502 fisher folks in 2015 and 353 in 2017 with an attrition rate of 30% in 2017. The high attrition rate was recorded because of high mobility and morbidity of fisher folks. The villages were purposively sampled based on their dominance in fish value chains and socio-economic profiles such as roads, as well as presence and distance to market. Individuals and households for the survey were randomly sampled using household registers from village heads. The questionnaires were administered by trained enumerators. The training included the interview approach, translation and ethical issues, and pre-testing of the questionnaire in a fishing community in Lake Chilwa, Zomba. The aim of pre-testing was to check on the clarity and relevance of the questions. FGDs involved resource mapping, institutional analysis, cause-effect analysis, seasonal calendars, and well-being or ill-being analysis. FGDs were conducted in all the five sampled villages. Participants to focus groups were based on sex and age. Three separate discussion groups comprising of males, females, and mixed groups of young males and females were conducted at each village with each group having six to eight members on average. The participants responded to various issues and questions, relating to fishing, processing, and trading and gender-related barriers for both men and women. In-depth interviews using semi-structured questions and discussions were conducted with 25 key informants using a snowball process. Secondary data from studies done in the region and other countries complimented the information obtained from the primary data and findings.

The qualitative studies used critical discourse analysis [22] and content analysis [23]. Critical discourse analysis and content analysis helped to identify dominant themes in relation to the study objective. Analysis of the quantitative structured household questionnaire surveys used the Statistical Package for Social Sciences (IBM SPSS) version 20. Descriptive statistical tables were developed on sex distribution of respondents, occupation, literacy levels, markets, and differences in ownership of assets between men and women.

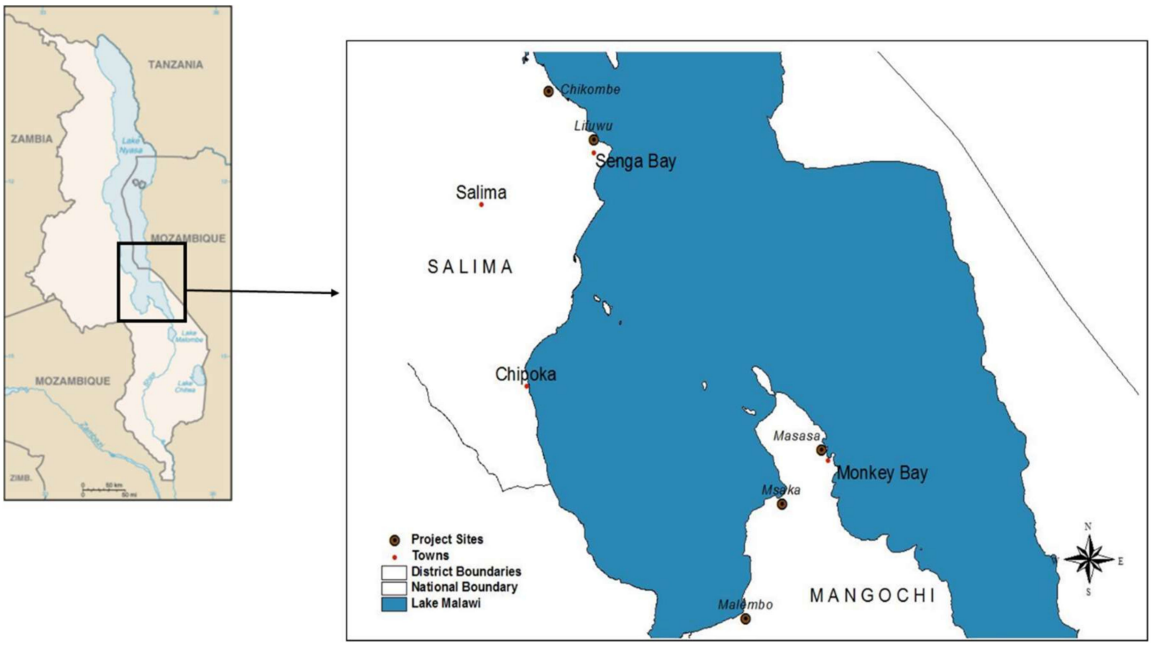

Figure 1. Lake Malawi study sites.

3. Results and Discussions

3.1. Participation of Males and Females at the Fishing Landing Sites

The study revealed big disparities in participation between men and women in the fish landing sites as shown in Table 1. Msaka and Madzedze showed a fairly higher percentage of women found in the fishing landing sites, 67% and 62% respectively. These women were basically gear owners and did not get involved in actual fishing. There were deep cultural beliefs and social norms that influenced women's participation in fishing. Social, cultural, traditional, and religious barriers were noted to be disadvantaging women's participation in the areas and they had imposed on them significant caring burdens, not only child-rearing, but also caring for the sick and the elderly. Traditionally, fishing is regarded as a man's job in all the fishing villages. Women are seldom expected to go fishing, at both artisanal and semi-commercial levels. The hard work and long hours involved in fishing was considered not favorable for women especially as it takes the woman away from home and her household chores. It was believed that the operation of some artisanal fishing crafts and gears like hook and line and rowing a canoe required the fisher to put on minimal clothing. Women by their accepted tradition are expected to dress properly and care for children at home especially during the night.

Table 1. Distribution of fisher folks at fishing landing sites by gender.

Fish Landing Site	Sex of Respondent				
	Male		Female		Total
	No.	%	No.	%	No.
Madzedze	60	38	99	62	159
Malembo	84	66	44	34	128
Msaka	37	33	75	67	112
Chikombe	37	97	1	3	38
Lifuwu	47	65	25	35	72
Total	265	52	244	48	509

An analysis on the sample distribution of males and females showed a lower percentage of females participating in fishing related activities in the selected landing sites. Chikombe in Salima had low participation of females (3%). Focus Group Discussions in Chikombe revealed that women were culturally not allowed to go to Mbenje Island where most of the fishing was done because it was believed to be against the spirits. The cultural limitation of women included access to fish at the landing site as stated by one of the participants during the FGDs at Chikombe.

"Even at the beach we were not allowed to buy fish, because of the cultural beliefs".

Women were always in the majority compared to men in attending meetings in the communities and participation in governance structures. However they often struggled to have their voices heard, provide input, or take leadership roles. In all the five fishing villages studied, chairpersons and vice chairpersons of Beach Village Committees (BVC) were men. Women were appointed as treasurers only in two BVCs. BVCs were constituted as part of the fisheries co-management arrangement in the Fisheries Conservation and Management Act of 1997. BVCs are composed of all people involved in fishing-related activities such as fishing, processing, fish trading, and boat building at a fishing village (also known as beach). Its main functions are to enforce fisheries management by-laws which are binding for its members and any persons present at or using the fishing village. It is recognized that women are likely to constitute an important part of the rural poor who depend on fisheries, agriculture, and natural resources for their survival, but they are still often excluded as a user group from decision processes over management of the resources. However, FGDs for men claimed that there were equal opportunities and freedom for women to participate in different activities only that women

tended to look down upon themselves. Nevertheless, there were still some barriers within the riparian communities that hindered women's participation in fishing and other development activities.

Fish processing is dominated by women because fish processing is traditionally considered women's work, as an extension of their home production activities [10,24]. This was confirmed by the fact that most of the women found at landing sites were mostly fish processors (52%) as shown in Table 2. The most common processing method was sun-drying where fish especially small pelagics are spread on open drying racks. The fish are continuously spread and turned to ensure that there is even drying. The other processing methods included smoking and frying. It should also be noted that most of the fish processing facilities were either located at their homesteads, if they owned them, or not far from their homes, if they were rented. The fish processing method again was determined by the fish species and also the prevailing market trends. This then gave them an edge on making decisions on the processing method they preferred. Table 2 further shows that more women (35%) than men (22%) were processing and trading fish especially small pelagic fishery. This is attributed to the fact that women were closer to their assigned household roles. It was also observed that in other fishing communities few women were allowed by their spouses to sell their processed fish in distant markets. Household roles which women normally play on a daily basis forced them to stay at home and prohibited them to go out to distant markets where in most cases they stayed long hours or days. By selling only in local markets, women were denied selling their fish products in lucrative markets where they could get higher profits. With the social, cultural, traditional, and religious norms inherent in most of the areas, women are thus barred from realizing their productive potentials.

Table 2. Occupation of fisher folks in Mangochi and Salima Districts.

Fishing Business	Male		Female		Total	
	No.	%	No.	%	No.	%
Fisher only	67	25.7	5	2.1	72	14.3
Processor only	84	32.2	124	51.5	208	41.4
Trader only	32	12.3	17	7.1	49	9.8
Fisher and processor	13	5.0	8	3.3	21	4.2
Fisher and trader	1	0.4	0	0.0	1	0.2
Processor and trader	57	21.8	85	35.3	142	28.3
Fisher, processor, and trader	7	2.7	2	0.8	9	1.8
Total	261	100.0	241	100.0	502	100.0

There were women fishers found at Malembo fishing site (34%). These women owned fishing gear such as nets, engine boats, and lanterns but again were not involved in actual fishing. The women that owned fishing gear were either professional employees in cities or sourced capital from their children working in urban industries. Women of Lifuwu complained of the discriminatory manner in which the fisheries development programs were designed. Particular references were the Lake Malawi Artisanal Fisheries Development Project (LMAFDP) and the Small-Scale Offshore Fishery Technology Development Project (SOFTDP). These projects were implemented by the Department of Fisheries in Malawi from 2003 to 2008 and 2005 to 2008 funded by the African Development Bank and the Icelandic International Development Agency respectively. Women observed that although the main objective of these projects was to support offshore small-scale fishing which was believed to be under-exploited for the deep-water demersal and pelagic species, only men were given soft loans to procure engine boats and better nets. Special consideration of women in the impact areas would have given them a chance to participate in the projects and realize their potential. The women felt that their involvement in these projects would have been beneficial to them as they also have the potential of achieving their set goals, as women from Lifuwu attested.

> *"We can a get a loan of 4 million kwacha and pay back within six months. We can also employ people and pay them well just as men".*

Targeting of men in the fishing communities by development agencies is therefore widening the gap of economic opportunities between women and men.

3.1.1. Education Levels and Illiteracy

In all sites, women were found inferior to their male counterparts in literacy levels (Table 3). According to the National Statics Office (NSO) [25], the Southern and Central Regions of Malawi had higher proportions of females without education, 21% and 20% respectively in 2016. Similarly, the study found that out of 509 people interviewed, 423 were able to read and 419 were able to write in Chichewa. From the population that was able to read in Chichewa, only 38% were females, out of the 419 respondents that were able to write in Chichewa, only 37% were females. Focus Group Discussions revealed that the slight improvements from the NSO results were attributed to adult functional literacy classes introduced in the fishing sites that were dominated by women.

Table 3. Literacy levels of people in fishing villages (2017) N = 509.

Literacy Proxy	Male		Female		Total	
	No.	%	No.	%	No.	%
Able to read English	128	25	97	19	225	44
Able to write in English	121	25	84	17	205	42
Able to read in Chichewa	232	46	191	38	423	84
Able to write in Chichewa	232	46	187	37	419	83
Able to read in Chiyawo	70	14	44	9	114	23
Able to write in Chiyawo	61	12	37	7	98	19

These functional literacy classes have so far helped women become knowledgeable in running businesses. They further assist them in making decisions and informed choices. In some cases, women who are able to read and write are given positions in different community governance structures. Thus a failure to educate or reduce illiteracy levels amongst women impedes their overall participation. However, Sharma and Nagaich [26] argue that participation of women in rural development activities is always larger than the male members of the society despite the influence of illiteracy levels. However. this participation does not bring any influence in decision-making even among few men because women are viewed as illiterate.

Common patterns also emerged from the results in the intersection of gender, income, and education. Less educated, resource poor women were concentrated in the lower end of the fish value chains such as provision of casual labor, small fish processing, and trading in small markets; resource rich males and a limited number of educated, resourced rich females occupied the upper end such as fishing, processing of big fish species, gear ownership, and transportation.

3.1.2. Markets and Marketing of Processed Fish

Women from the fishing villages were trading in low valued fish, mostly dried *Engraulicypris sardella* (*Usipa*) on a daily basis. Slightly more women (44%) than men (41%) were trading their fish to daily distant markets that took more than a day for each trading errand (Table 4). From the results, women participate more in distance markets than men. This confirms the fact that women dominate the small pelagic fisheries value chain except at the fishing node. However, when they go to markets, women reported being granted limited access to trading spaces at markets such as in Limbe, Liwonde, and Lilongwe where intermediate buyers restricted entry into the market. In all these markets, wholesalers who were mostly women for small pelagics, could only sell to intermediate buyers outside the markets and in most cases prices were dictated by the intermediate buyers. Additionally, women reported that they were harassed especially at night in these markets. Deeper analysis of these harassers indicated that they were actually men believing in the stereotype that women that do business are mostly not married and therefore could easily provide commercial sex.

Table 4. Markets for processed small pelagic fish.

Market	Male		Female		Total	
	No.	%	No.	%	No.	%
At the process site or beach	78	29.3	26	10.7	104	20.4
Local market in the area	18	6.8	12	4.9	30	5.9
Distant daily market	109	41.0	108	44.4	217	42.6
Distant weekly market	56	21.1	91	37.4	147	28.9
Other	5	1.9	6	2.5	11	2.2

Women also faced transportation challenges in accessing markets. They mostly used trucks and buses that were all controlled or owned by men. During market days, the demand for fish transportation was so high such that transport owners increased their transport charges. In ensuring that fish reaches the market at the right time (in most cases early in the morning or at night) before the market starts, some women were forced to negotiate transport in exchange for sex. It was also observed that most of the transport vehicles were not covered and this resulted in high spoilage of their fish products and misplacement of consignments especially during rainy seasons. The misplacement was attributed to the new traffic regulations that do not allow women to use the same transport carrying fish. Instead the women are encouraged to use passenger vehicles.

3.2. Asset Ownership

Results on asset ownership showed that most of the productive assets were owned and controlled by men. In Table 5, it is shown that 34% of women owned engine boats and/or canoes against 66% for men. Similarly only 30% of women owned gill nets against 70% men. Women were found to own less valuable assets like fish drying racks and small open-fire fish smoking kilns.

Ownership of assets was very gender orientated in the fishing communities with so many barriers to women's acquisition of valuable assets because they had limited access to financial lending organizations and extension services. There was limited social inclusion to accommodate economic fairness in the fishing sector, where women generally earned less than men, because they did not command and control large and more productive assets, such as boats, engines, and other fishing gear. It should be noted that women in the fisheries sector were not spared from unequal inheritance and legal rights even on assets owned by their male relatives such as parents and spouses. Initiatives towards advancing women's empowerment are reported to be helping to improve their income and food security [27]. Sharaunga et al. [28] report that households are likely to be food-secure when they are headed by women with higher levels of economic agency, psychological empowerment, and financial management skills, yet ownership, access, and control of productive assets or resources have always been a challenge to women.

Table 5. Asset ownership by fisher folk in Mangochi and Salima districts.

Asset	Male		Female		Minimum Resale Value (MWK [1])
	No.	%	No.	%	
Plank Boat	11	79	3	21	107,500
Engine Boat	53	66	27	34	1,750,000
Canoe	85	66	43	34	80,000
Gill net	38	70	16	30	40,000
Beach Seine	28	62	17	38	375,000
Open Seine net	44	73	16	27	600,000
Long lines	24	80	6	20	10,000
Fish drying rack	159	44	202	56	20,000
Smoking kilns	42	36	73	64	8000

[1] MWK is Malawi currency (Kwacha), exchange rate in May 2017 US$ = 725.

3.3. Barriers to Women Participation and Decision Making

The study showed that there were differences in the involvement of men and women in decision making. Women had little influence on fishing sites even those used by their spouses (9%) as indicated in Table 6. Decision making on markets, storage, processing, and transportation of small pelagic fish favored women. In general, women's involvement in decision making is very high in the value addition activities of the value chain. However, decision making on the benefits of the value chain such as incomes were skewed to men as one woman trader attested.

" . . . ..we many times make money from fish trading. But I don't spend this money alone, I give it to my husband who decides what we should do".

Table 6. Men and women's participation in decision making in fishing related activities.

	Male No.	Male %	Female No.	Female %	Total No.	%
Fishing						
Yes	72	91.1	7	8.9	79	100
No	99	36.7	171	63.3	270	100
Fish processing						
Yes	125	44.3	157	55.7	282	100
No	49	69	22	31	71	100
Fish storage						
Yes	62	44	79	56	141	100
No	111	52.9	99	47.1	210	100
Fish transportation						
Yes	81	43.1	107	56.9	188	100
No	90	55.6	72	44.4	162	100
Fish marketing						
Yes	139	50.4	137	49.6	276	100
No	30	44.8	37	55.2	67	100

Similarly, women as major contributors in the fisheries sector had less influence in deciding policy changes that affect their businesses. As indicated earlier, there were cultural and practical constraints for their participation in fisheries governance structures such as the BVCs [7]. Women that are given positions in different community structures in most cases do not make decisions, as their men counterparts dominate and control them, even if the men happen to have no position in the committees. According to Resurreccion [29], gender norms assign social reproduction obligations disproportionately to women and restrict their overall participation in decision making. In addition, the FAO [10] mentions the limited participation in decision-making of women as the main cause of unfavorable policies and practices that are prevalent in the fisheries sector.

3.3.1. Technology Use, Access to Information and Finances

The study results showed that both men and women acknowledged that there were barriers to adoption of technologies emanating from social, economic, and cultural bases. One of the common barriers to technology uptake by women and youth as expressed by respondents in the FGDs was the fact that some men did not give their wives opportunity to do business. It was learnt that women had a desire to adopt new technologies but men controlled all household finances. The initial costs in commercial fishing were said to be expensive because they required investments in equipment such as marine engines, boats, nets, and subsequent purchasing of fuel and upfront payments to the fishing crew for operations. Ownership of these fishing equipment required access to financial capital which often did not favor women. The proliferation of micro-credit institutions in the areas had been helpful

but access to financial loans was limited because of prohibitive conditions and the amount of financial loans that they offered.

Barriers to technological advancement for women were also discovered to be present at household level. There were gendered preferences on technology choice between men and women. In most cases technologies that were thought to be important to women were not important to men. For example, women favored ownership of mobile phones for market information while men favored owning television screens for entertainment. Men were in many cases resistant to allowing their wives to own and use technologies that would result in boosting business profitability. Men said that having a wife who makes more money affects headship of the family. According to Kleiber et al. [7], there are multiple reasons for this resistance. Some men want to defend their privileges and power because of the fear of the loss of authority and economic benefits brought by the perceived gender equality. Some men may resist gender equality because of a belief in male supremacy. Most difficult to address was the fact that change towards gender equality required new patterns of masculinity and thus was perceived as a threat to the identity of men.

3.3.2. Family Structure

Family structures defined as the hierarchical order of which 'family' constructs to maintain its social 'structure' and the framework which indicates the bio-technical way of orders, provide both opportunities and limitations for women's participation in the fisheries value chain. Large families provide a source of cheap labor for fishing households, but require more financial resources for its sustenance. In general, the survey respondents had big families that averaged about six members per household. Other religious beliefs in the study areas allowed polygamy and this promoted extended and large families. Culturally people still believed in early child marriages with the assumption of safeguarding the girl child from promiscuous behavior during adolescence.

In other cases, migration of male fishers to distant fishing villages resulted in men remarrying in the villages where they migrated. The old wives were therefore left to care for children with very little support from their husbands as their attention was given to the new wives. Consequently, extra burden was put on women as they tried to balance the running of small fish processing business while taking care of their exceptionally large families. The remarrying and extramarital affairs also brought about continued spread of sexually transmitted diseases which negatively affected women as care givers. Women therefore had to bear the financial burden for the family's day to day survival while not forgetting to sustain their fish enterprises. This can also explain women's relatively high levels of participation in the fish value chain of small pelagic fishery.

3.3.3. Disease Incidences—Malaria and Bilharzia

Fishing communities along Lake Malawi faced health issues including high incidences of malaria, bilharzia and in some cases cholera. Malaria prevalence stemmed from two factors: the presence of swamps and the misuse of bed nets. It was observed that while mosquito nets were provided free by the government, development partners and Non-Governmental Organizations (NGOs), they were hardly used for prevention of malaria. They were mostly used as attachments to fishing nets and as covers of fish drying racks (Figures 2 and 3). Some mosquito nets were also used to fence vegetable gardens and as covers for packaging fish. In other cases, where mosquito nets were correctly used, malaria cases could be attributed to the fact that men tended to spend long hours in the dark as they prepared nets for their next fishing trip or whilst fishing while women were busy tending to their processed fish on the drying racks. During these times mosquitos causing malaria could easily bite them.

Bilharzia and cholera normally originated from poor sanitation in the fishing villages or fish landing sites. Prevalence of bilharzia was reported high reaching as far as 45% in fishing villages. This was because its management by health officials was compromised by the mobile nature of fisher folks and lack of sanitation facilities such as latrines. Results from key informants such as traditional leaders

and government workers showed that fisher folks both men and women were hard to reach. This was because bilharzia management campaigns were carried out during the day when men were fishing or sleeping after long nights of fishing and women travelled to distant markets. These health issues not only affected the households' physical health but they also drained them financially. Men, who are considered bread winners in rural communities, fail to attend to their sources of livelihoods and in the end women are the ones who face the blunt effects.

Figure 2. Mosquito nets attached to fishing nets.

Figure 3. Fish (*usipa*) drying on mosquito nets.

4. Conclusions

Gender inclusiveness and equality are prerequisites for strong, sustainable, and balanced economic growth that can build and sustain socio-ecological systems. The study results showed that women contribute a lot to the fisheries sector and are to be found in all of the activities of the value chain except fishing although they face barriers that limit their participation. However, the contributions of women to the artisanal fish industry have received little attention from fisheries development programs and policies. The complex interaction of social norms, values, practices, and labor roles limits women's participation in decision-making on governance and policy reforms that can enhance benefits from aquatic ecosystem services. Additionally, cultural beliefs also affect women's confidence to speak or take leadership roles in order to safeguard their interests in the market, household, or community. Their limited access to capital and thus lack of access to technologies, as well as social norms, impede their interaction with value chain actors.

An inclusive ecosystem is therefore required that should address management of the ecosystem services and their utilization. Gender barriers in fisheries should therefore be addressed through a proactive transformative process rather than just through gender mainstreaming, by first enhancing

evidence-based, gender-focused interventions and innovations that address gender inequities and positively influence the production and equitable distribution of fish. Second, fisheries policies should address gender barriers and mechanisms of change that will safeguard access to fish resources for women and enable lasting shifts towards reducing poverty and increasing food and nutritional security.

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References

1. Brown, K.; Fortnam, M. Gender and Ecosystem Services: A blind spot. *Gender Ecosyst. Serv.* **2018**, *31*, 257–272.
2. Folke, C. Resilience: The emergence of a perspective for social–ecological systems analyses. *Glob. Environ. Chang.* **2006**, *16*, 253–267. [CrossRef]
3. Van Dijk, H.; Bose, P. Dryland landscapes: Forest management, gender and social diversity in Asia and Africa. In *Drylands Forests: Management and Social Diversity in Africa and Asia*; Bose, P., van Dijk, H., Eds.; Springer: New York, NY, USA, 2016; pp. 3–21, ISBN 978-3-319-19405-9.
4. Torell, E.; Owusu, A.; Okyere Nyako, A. *USAID/Ghana Sustainable Fisheries Management Project (SFMP), Ghana Fisheries Gender Analysis*; Coastal Resources Center, Graduate School of Oceanography, University of Rhode Island: Narragansett, RI, USA, 2015; GEN002; 21p.
5. Government of Malawi (GoM). *Annual Economic Report*; Department of Economic Planning and Development, Ministry of Finance, Economic Planning and Development: Lilongwe, Malawi, 2017.
6. Government of Malawi (GoM). *Malawi National Gender Policy*; Ministry of Gender, Children, Disability and Social Welfare: Lilongwe, Malawi, 2015.
7. Kleiber, D.; Harris, L.M.; Vincent, A.C.J. Gender and small-scale fisheries: A case study for counting women and beyond. *Fish Fish.* **2014**, *16*, 547–562. [CrossRef]
8. Weeratunge, N.; Snyder, K. Gleaner, Fisher, Trader, Processor: Understanding Gendered Employment in the Fisheries and Aquaculture Sector. Available online: http://www.fao-ilo.org/fileadmin/user_upload/fao_ilo/pdf/Papers/Weeratunge-final.pdf (accessed on 31 August 2018).
9. WorldFish. Gender in fisheries: Do women support, complement or subsidize men's small-scale fishing activities. In *Issues Brief 2108*; The WorldFish Center: Penang, Malaysia, 2010.
10. FAO. *The State of World Fisheries and Aquaculture 2016*; Contributing to Food Security and Nutrition for All; FAO: Rome, Italy, 2016; 200p.
11. Villamor, G.B.; van Noordwijk, M.; Djanibekov, U.; Chiong-Javier, M.E.; Catacutan, D. Gender differences in land-use decisions: Shaping multifunctional landscapes? *Curr. Opin. Environ. Sustain.* **2014**, *6*, 128–133. [CrossRef]
12. Chiwaula, L.; Jamu, D.; Chaweza, R.; Nagoli, J. *The Structure and Margins of the Lake Chilwa Fisheries in Malawi: A Value Chain Analysis*; The WorldFish Center: Penang, Malaysia, 2012.
13. Cornwall, A.; Harrison, E.; Whitehead, A. (Eds.) *Feminisms in Development: Contradictions, Contestations and Challenges*; Zed Books: London, UK, 2007; pp. 1–20, ISBN 1842778188.
14. Adams, H.; Salehin, M.; Huq, H.; Adger, N.; Rahman, R. Wellbeing-Ecosystem Service Links: Mechanisms and Dynamics in The Southwest Coastal Zone of Bangladesh. Available online: http://www-dev.espa.ac.uk/publications/wellbeing-ecosystem-service-links-mechanisms-and-dynamics-southwest-coastal-zone (accessed on 31 August 2018).

15. Calvet-Mir, L.; March, H.; Corbacho-Monné, D.; Gómez-Baggethun, E.; Reyes-García, V. Home garden ecosystem services valuation through a gender lens: A case study in the Catalan Pyrenees. *Sustainability* **2016**, *8*, 718. [CrossRef]
16. Shen, Z.; Wakita, K.; Oishi, T.; Yagi, N.; Kurokura, H.; Blasiak, R.; Furuya, K. Willingness to pay for ecosystem services of open oceans by choice-based conjoint analysis: A case study of Japanese residents. *Ocean Coast. Manag.* **2015**, *103*, 1–8. [CrossRef]
17. Parks, S.; Gowdy, J. What have economists learned about valuing nature? A review essay. *Ecosyst. Serv.* **2013**, *3*, 1–10. [CrossRef]
18. Agarwal, B. *Gender and Green Governance: The Political Economy of Women's Presence within and beyond Community Forestry*; Oxford University Press: Oxford, UK, 2010; pp. 169–214, ISBN 978-0-19-956968-7.
19. Agarwal, B. Participatory Exclusions, Community Forestry and Gender: An analysis for South Asia and a Conceptual Framework. *World Dev.* **2001**, *29*, 1623–1648. [CrossRef]
20. Gee, J.P. *An Introduction to Discourse Analysis: Theory and Method*, 3rd ed.; Routledge: New York, NY, USA, 2011.
21. Government of Malawi (GoM). *State of the Environment Report for Malawi*; Ministry on Mines and Natural Resources: Lilongwe, Malawi, 2002.
22. Fairclough, N.; Pardoe, S.; Szerszynski, B. Critical discourse analysis and citizenship. In *Analysing Citizenship Talk: Social Positioning in Political and Legal Decision-Making Processes*; Hausendorf, H., Bora, A., Eds.; John Benjamins: Amsterdam, The Netherlands, 2006; pp. 98–123.
23. Bryman, A. *Social Research Methods*; Oxford University Press: Oxford, UK, 2001.
24. Novaczek, I.; Fitzpatrick, S.; Lewis, S.R.; Mitchell, J. *At the Table: Exploring Women's Roles in the PEI Fishery*; Social Economy and Sustainability Research Network, University of Prince Edward Island (UPEI): Charlottetown, PE, Canada, 2009; pp. 5–8.
25. National Statistical Office (NSO). *Malawi Demographic and Health Survey 2015-16*; National Statistical Office: Zomba, Malawi, 2017.
26. Sharma, P.; Nagaich, S. Women's Literacy Rate, Sex Ratio, and Women Work Participation in Punjab: A Granger Causality Analysis. *Arthshastra* **2014**, *3*, 37–45. [CrossRef]
27. Ofreneo, R.P.; Hega, M.D. Women's solidarity economy initiatives to strengthen food security in response to disasters: Insights from two Philippine case studies. *Disaster Prev. Manag.* **2016**, *25*, 168–182. [CrossRef]
28. Sharaunga, S.; Mudhara, M.; Bogale, A. The impact of women's empowerment in agriculture on household vulnerability to food insecurity in the KwaZulu-Natal Province. *Forum Dev. Stud.* **2015**, *42*, 195–223. [CrossRef]
29. Resurreccion, B.P. Rules, Roles and Rights: Gender, Participation and Community Fisheries Management in Cambodia's Tonle Sap Region. *Int. J. Water Resour. Dev.* **2006**, *22*, 433–447. [CrossRef]