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Gender-specific roles and opportunities in the value chain: A case study of culture-based fisheries in selected Sri Lankan reservoirs

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Abstract

Value chain analysis is a useful tool that guides targeted interventions for developing value chains to enhance economic productivity, social well-being, and environmental performance. Examining value chains from a gender perspective can enable the design of more opportunities for women in the fisheries sector to address gender inequalities. This study examined gender-specific roles and opportunities in finfish and giant freshwater prawn (GFP) value chains within five selected reservoirs in Sri Lanka. The floating coconut model was used to identify gender roles in the selected fishing communities and value chain mapping techniques were used to reflect gender engagement along the chain. The analysis was based on data collected using key informant interviews and focused group discussions in the year 2024. Based on the findings, economic activities within the culture-based fishery community can be categorized as formal or informal. Fishing and selling fish in the local market and selling freshwater prawns to collectors who work for exporters are examples of formal economic activity. However, there are about 40 different kinds of informal economic activities in which both men and women participate. Informal activities highlight the important role of women in the household economy where there is a clear division of labor between women and men. Two different value chains were identified based on the five selected reservoirs: one for finfish and the other for GFPs. Both men and women participate in all stages of the value chains. Men dominate in fishing, fish collection, retailing, and wholesaling, with varying support from female family members. Females dominate in fish processing. The GFP value chain differs from that of the finfish's, as it mainly focuses on the export market, with only a small portion going to the local market. The prawns are mainly caught as by-catch in gillnet fisheries for finfish. Women play a crucial role in carefully handling and storing GFPs to maintain its quality, as they are perceived as patient and meticulous in disentangling GFP from fishing nets without harming them. Engaging in fishing can provide a valuable opportunity to balance work life and family responsibilities. Providing training for members of the fishery community to convert non-economic activities into economic activities would enhance economic and social benefits within fishing households, as well as within the fisheries sector.

Keywords: Culture Based Fisheries, Finfish, Giant Freshwater Prawns, Inland Reservoirs

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Introduction

In small-scale fisheries, sustainable livelihoods are treated as one of the priorities in the United Nations Sustainable Development Agenda (FAO/RAP/FIPL, 2004). Gender inequality is prevalent in the fisheries industry, with women often being undervalued and underrepresented in fisheries management and development (Mangubhai and Lawless, 2021). Due to the limited understanding of women's roles and their contribution to the economy, women interests and needs are not adequately addressed in fisheries policy making. Therefore, greater focus on gender as an essential area of study within fisheries and aquaculture sectors is necessary. Fisheries sector is still considered a male-dominated industry. However, women's contributions often extend beyond post-harvest activities and marketing, to include pre-harvest operations, such as preparing nets, boats, and capturing bait and fry (Lentisco and Lee, 2015).

Although women are not engaged in fishing directly, they are involved in fish processing and other income-generating activities such as processing and marketing in fish value chains. Therefore, women significantly contribute to ensuring food security of their community (Lentisco and Lee 2015). Additionally, a limited understanding of women's unique roles and contributions can result in a lack of recognition of their needs and interests in policies and programs, affecting sustainable development outcomes (Weeretunge et al., 2010). Therefore, fisheries practitioners need to mainstream gender, drawing on the lessons learned from actual case scenarios, by applying a value chain approach, and understanding the challenges and opportunities arising from a more integrated perspective.

In Sri Lanka, culture-based fisheries (CBF) in inland reservoirs are known to be an environmentally friendly fisheries enhancement approach, which significantly supports rural economies (De Silva, 2003; Amarasinghe and Nguyen, 2010; Kularatne et al., 2019). Sri Lanka has considerable potential to develop CBF due to its substantial extent of inland water sources, estimated as much as 206,000 ha. The reservoir density in Sri Lanka is therefore about 3.1 ha for every km2 of the island (Jayasinghe and Amarasinghe, 2018). The Sri Lankan CBF system is mainly cantered around reservoirs. These reservoirs are broadly categorized as major (> 800 ha), medium (800–200 ha), and small (<200 ha) based on their size.

CBF is a secondary usage of reservoirs, the primary use being irrigation for agriculture. For the development of CBF in Sri Lanka, Chinese and Indian major carps and more recently, the giant freshwater prawn (GFP), Macrobrachium rosenbergii, are stocked in these reservoirs to enhance fisheries production (Wijenayake et al., 2021). In addressing sustainability in the CBF sector, strengthening the collective participation of rural communities is a major challenge. Furthermore, there is increasing concern over gender roles in the CBF sector (Lentisco and Lee, 2015) Surprisingly, gender roles and opportunities are seldom studied, and it is unclear how they contribute to the value chain of the CBF.

In order to address this knowledge gap, the main research question addressed by this study was what are the gender specific roles and opportunities along the value chain of CBF surrounding major inland reservoirs in Sri Lanka? The main objectives were to identify economic and non-

economic activities of both male and females and to construct a draft gendered value chain in the CBF sector of Sri Lanka.

The findings of this study represent part of a comprehensive study to develop CBF value chains in 48 reservoirs across Sri Lanka within a project implemented by a consortium of Sri Lankan universities in collaboration with James Cook University of Australia.

To understand the gender role in fishing and allied activities, a qualitative approach known as the floating coconut model (Carnegie et al., 2012; McKinnon et al., 2016) was employed to acquire an initial understanding of male and female activities in the selected CBF. In this qualitative approach, diverse economic tasks associated with the CBF activities were imagined as being like a 'floating coconut', where some parts of the economy can be seen above water (formal economy), while most of these activities is submerged under water (the informal economy and the non-cash economy). For this purpose, the community members of the five reservoirs were invited to indicate their diverse economic engagements.

For the CBF production in the five reservoirs, value chain mapping (Nguyen, 2022) was performed to understand the range of stakeholders involved in this industry. Based on the value chain mapping, product flow from the harvest to the consumer, product volumes, value addition at different stages of the chain, and relationships between different stakeholders in different nodes of the chains were examined. Moreover, gendered value chain analysis (Mayoux and Mackie, 2008; Coles and Mitchell, 2011; AgriProFocus, 2012) was used to determine the differentiation of male and female engagement in activities identified along the value chain. Accordingly, value chains were generated and analysed for finfish and GFPs separately.

The first stage of the study focused on the fisheries of five reservoirs of Sri Lanka, namely Iranamadu wewa (2927 ha) and Pudumurippu wewa (151 ha) in the KIlinochchi district, Tabbowa wewa (607 ha) and Vijayakadupotha wewa (243 ha) in the Puttalam district, and Urusita wewa in the Monaragala district (262 ha). This study will cover an additional 43 reservoirs in the next stage of data collection, bringing the total to 48 reservoirs upon completion. Reservoirs selected for the present study along with the proposed reservoirs for the comprehensive study are indicated in Figure 1.

The rationale for the selection of these reservoirs included several criteria, such as the range of geographical locations, sizes, marketing practices, and social context of fishing communities. Of the five selected reservoirs, two were in the Kilinochchi district, two in the Puttalam district, and one in the Moneragala district. Among them, one was a major reservoir, three were medium reservoirs, and one was a minor reservoir. Reservoir communities in the Puttalam district were better connected to the export markets than those in the Kilinochchi and Moneragala districts because most of the export companies were located closer to the airport.

In the five reservoir communities studied, 97 percent of households in the Kilinochchi district were of Tamil ethnicity, while most households in the Puttalam and Monaragala districts were of Sinhalese ethnicity with a smaller number of households of Tamil and Muslim ethnicity.

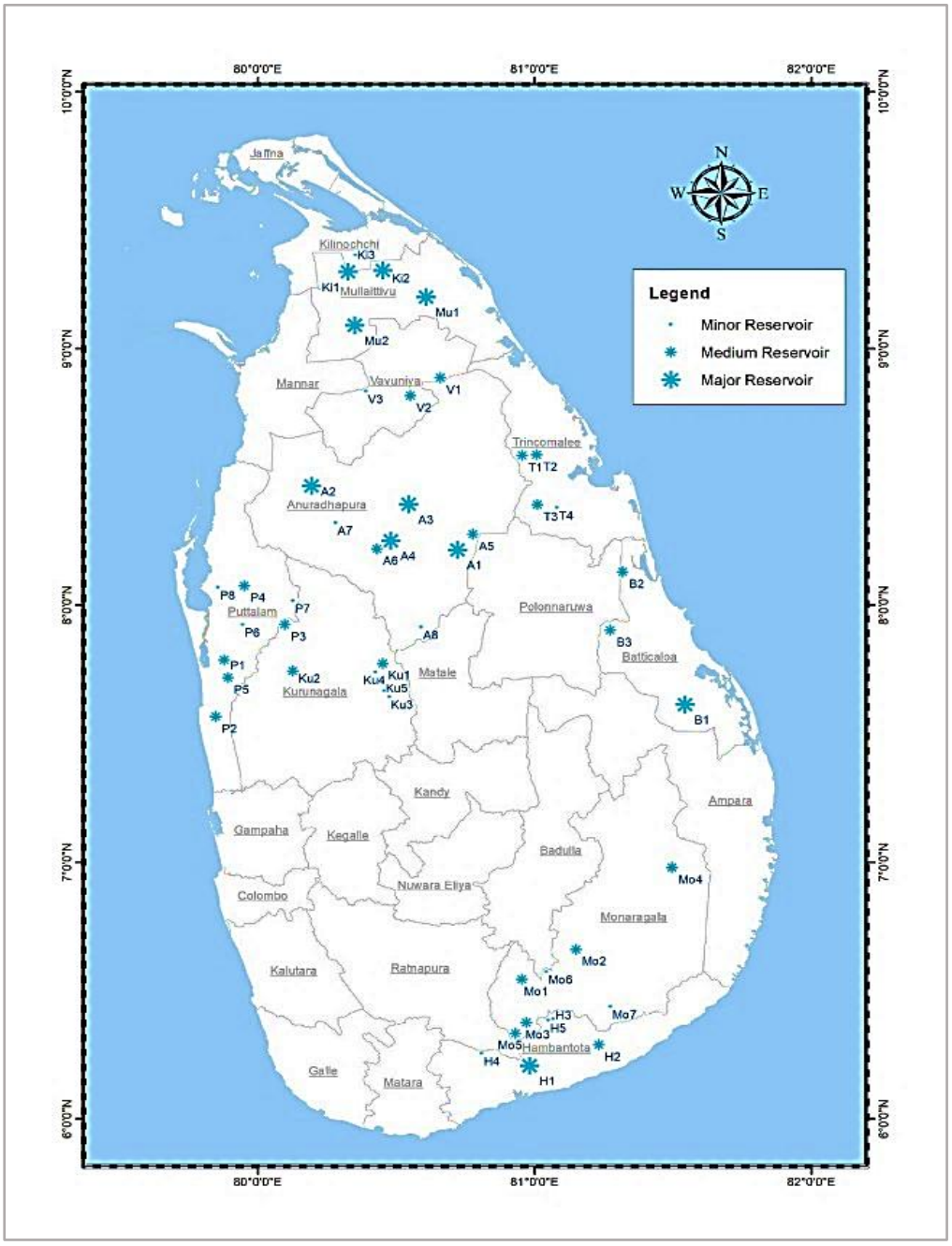

Figure 1. Locations of the 48 reservoirs of the comprehensive study. Reservoirs selected for the present study: Iranamadu wewa (Ki2), Pudumurippu wewa (Ki3), Tabbowa wewa (P4), Vijayakadupotha wewa (P5) and Urusita wewa (Mo5)

Data was also collected using focus group discussions (FGDs) among fishery society members, collectors, venders, and exporters to map the value chain and assess roles of stakeholders, functions, and nodes. In addition, key informant interviews (KIIs) with fisheries society leaders, knowledgeable older society members, National Aquaculture Development Authority (NAQDA) extension officers, and export company owners were used to identify different market channels that are operated along the value chain. A total of 101 observations were recorded, among which 85 male and 16 female activities were documented through participatory observation. Moreover, 54 men and 08 women were interviewed. The data collection procedure was conducted in the

year 2024. The number of participants in POs, FGDs, personal interviews (PIs), and KIIs in the five reservoirs are given in Table 1.

The FDGs with fishers, family members, vendors, collectors, and traders were used to assess the following themes (see also Appendix I):

- Main duties and responsibilities of stakeholders engaged in fishing and fishing-related activities
- Paid and non-paid activities
- Women's roles in male dominant activities

The KIIs were used to gain a better grasp of the following themes in the study locations:

- Flow of harvested finfish and GFPs
- Daily routine of members of the fishery communities
- Perceived reasons for women's engagement or non-engagement in fishing-related activities

Table 1: Number of participants in different survey types

Reservoir	**POs**						**FGDs**						**PIs**	
Type of Participant	**F**		**C**		**V**		**F**		**C**		**V**		**E**	
Gender	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Iranamadu	17	8	2	-	18	1	-		-		14	1	2	-
Pudumurippu	12	-	1	1	3	-	-	-	-	-	-	-		
Tabbowa	13	4	1	-	2	-	4	4	-	-	-	-		
Urusita	11	-	1	1	4	1	7	1	-		-			
Vijayakadupotha		-	-	-	-	-	6	-	-	-	-	-		
Total	53	12	5	2	27	2	17	5	0	0	14	1	2	0

Note: Participatory Observations (POs), Focus Group Discussions (FGDs), Personal Interviews (PIs), and key informant interviews (KIIs) conducted in the five reservoirs. F: Fishers C: Collectors; V: Venders; E: Exporters.

Results

Women's (on the left in pink) and men's (on the right in blue) activities have been arranged on a floating coconut model (Figure 2). The formal employment is shown above the waterline and work for cash in the informal sector, unpaid work in community, and household economies and leisure activities are shown under the waterline.

In the CBF activities in reservoirs, the formal economic activities included fishing, selling of fish in the local market, and selling of freshwater prawns to collectors employed by exporters. The informal economic activities were numerous (nearly 40 in total), and both men and women seem sharing these activities. Women's involvement in the household economy is notable which consumes a large proportion of their time.

Fisher community members are doing several types of activities other than fishing related activities (KII quotation 01). They have enough time to engage in other activities, because fishery society officially allocate only two time slots per day to engage fishing. Additionally, there is a clear-cut division of labour between women and men in many activities. For example, women are engaged in preparing meals for the family and childcare, while men are responsible in participating in fish breeding, transport, and security operations to prevent illegal fishing.

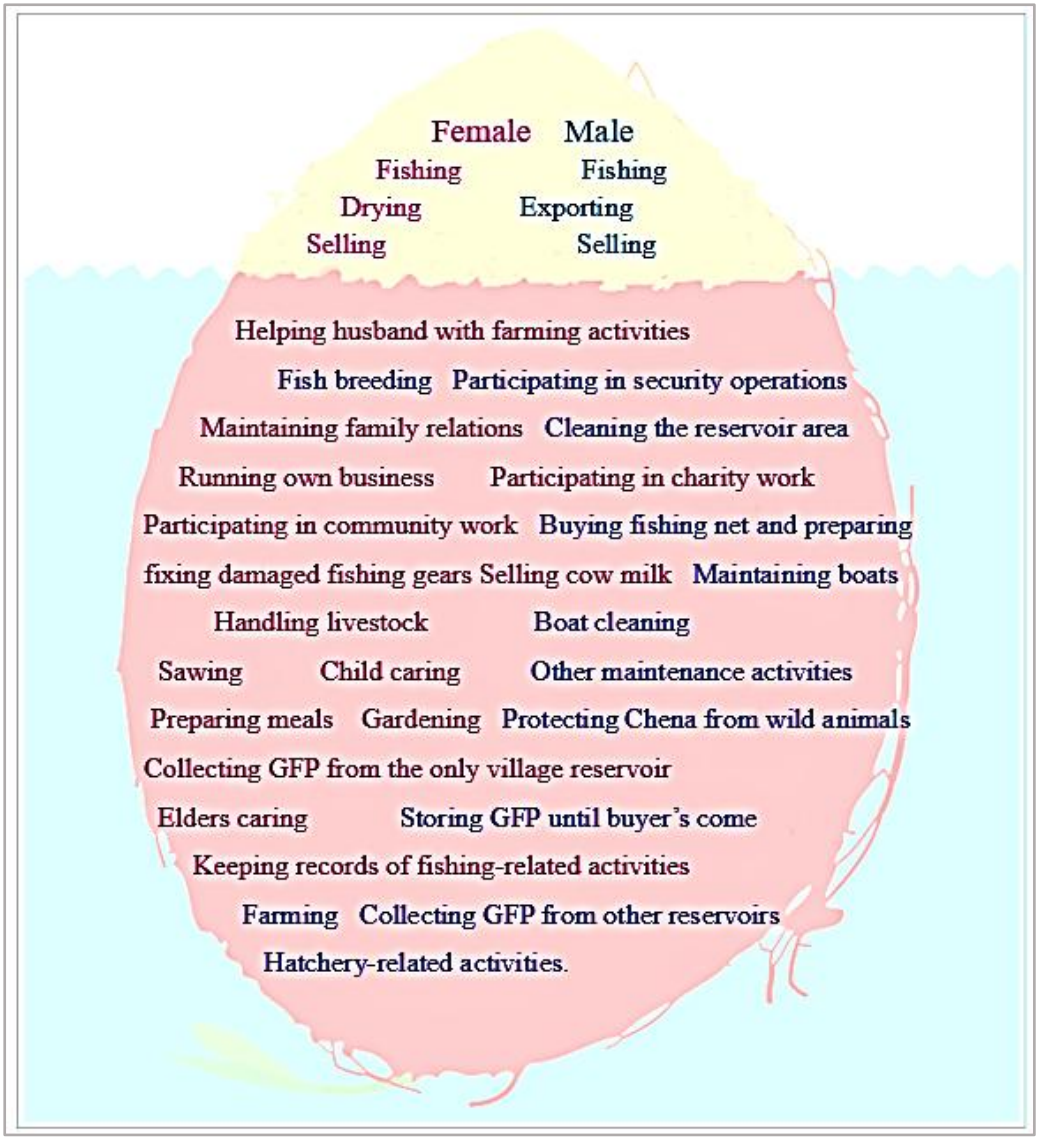

Figure 2. The floating coconut model with gender roles based on field data (both POs and KIIs), PO: Participatory Observations, KII: Key Informant Interviews

"The village reservoir is extremely important for the villagers as it provides them with food and a source of income. The fishermen have different ways to make money because they have enough time to engage in activities other than fishing. Most fishermen are involved in farming or taking care of livestock. They go to the reservoir early in the morning to retrieve their fishing nets and then return in the evening to cast them. For the rest of the day, they engage in other activities such as farming, gardening, driving taxis, running their businesses, or taking care of their families. Both men and women have enough time for engaging other activities while still being able to be

a fisher, which is a real advantage for maintaining a balanced life. (KII 01: Male Fisher, 61 years old., Tabbowa Reservoir, Puttalam district)

Based on the collected data using FGDs among fishery society members and vendors, and KIIs in the five reservoirs investigated, two different value chains could be identified. One value chain was for the finfish species that are sold to village communities, and the other was for the GFPs targeted at the export market (Figures 3 and 5).

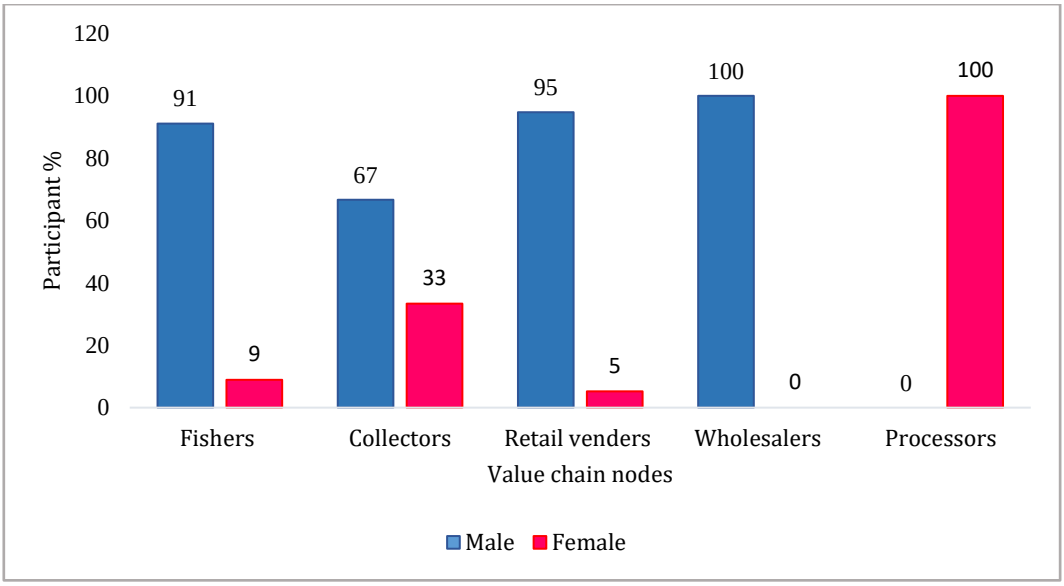

Figure 3. Male and female participation ratios in the finfish value chain

Figure 3 illustrate the number of males and females participate in finfish value chain activities. Mapping techniques were used to identify gender participation in the two types of value chains. The interrelation among the value chain stakeholders and gender involvement in each node for the finfish harvest is illustrated in Figure 4. Both male and female participation could be seen in every node of the value chain. However, in nodes such as fishing, fish collecting, retailing and wholesaling, the contribution of men was predominant which was >90% in each node. In contrast, 100% of those engaged in fish processing were women. However, fishers' wives, daughters, and their sons help them. It was a common practice that females supported men in cleaning fishing gear after each fishing trip (Figure 7).

> *"Even though fishers' wives normally don't come to the landing sites, they manage childcare activities and essential family tasks. After the fishing trip, fishers bring the fishing nets back home. It's important to clean the fishing gear after the trip because leaf litter, and aquatic plants get tangled in the nets. Fishers often don't have time to do this alone, so it's common for fishers' wives to support their husbands by helping to clean the gear. It's like a part of their daily routine"* ***(KII 02: Male Fisher, 56 years old., Urusita Reservoir, Monaragala district)***

According to the KIIs quotation 02, cleaning the fishing gear was part of the day-to-day activities in fishery families. The wives of the fishermen provide their full contribution to clean fishing gears. In contrast, a specific point was highlighted from by an Iranamadu reservoir Society member. The society introduced a payment system as a strategy of benefit sharing to the villages (KIIs 03).

> *"The Irnamadu Reservoir is in the Kilinochchi district, which was one of the worst war-affected areas. As a result, many of the families in this village are headed by females due to the loss of their husbands. To support the women, the fishery society allows them to engage in fishing activities. The villagers are permitted to visit the landing sites to assist the fishers. Girls, boys, and women usually help in cleaning the fishing nets, while boys are specifically involved in cleaning the fish boats. Boys' and girls' participation rate is high when school holiday periods. With the approval of the society members, the helpers receive a minimum payment of 500 rupees, which has been very helpful. Sometimes, the fishers also provide fish for family consumption without any charge.* ***(KII 03, female fisher, 48 years old., Iranamadu reservoir, Kilinochchi district)***

Fish handling activities at the landing sites are mainly done by men, while female engagement can also be seen for some extent. Although male fish collectors physically handle fish, record keeping activities are done by women or their daughters. These records include details of fishers[1], species-wise weight of fish landed by each fisher, and commission paid to the fishery society.

There is no processing activity at the landing site. After unloading the catch, and once the collectors and fisheries society representatives have completed the records, fish vendors buy fresh fish wholesale or retail. Wholesale may happen only during the peak seasons. Wholesale traders come from close villages or nearby districts. Their market destinations are distant urban centres. Bicycle vendors buy fish for retail purposes. Retailers sell fish in the village areas and nearby village areas within approximately 10–15 km of the reservoir. Motorbike vendors cover approximately 15–25 km per day. It was observed that only 5% of females participated in retail selling as vendors among the 38 observations (Figure 4).

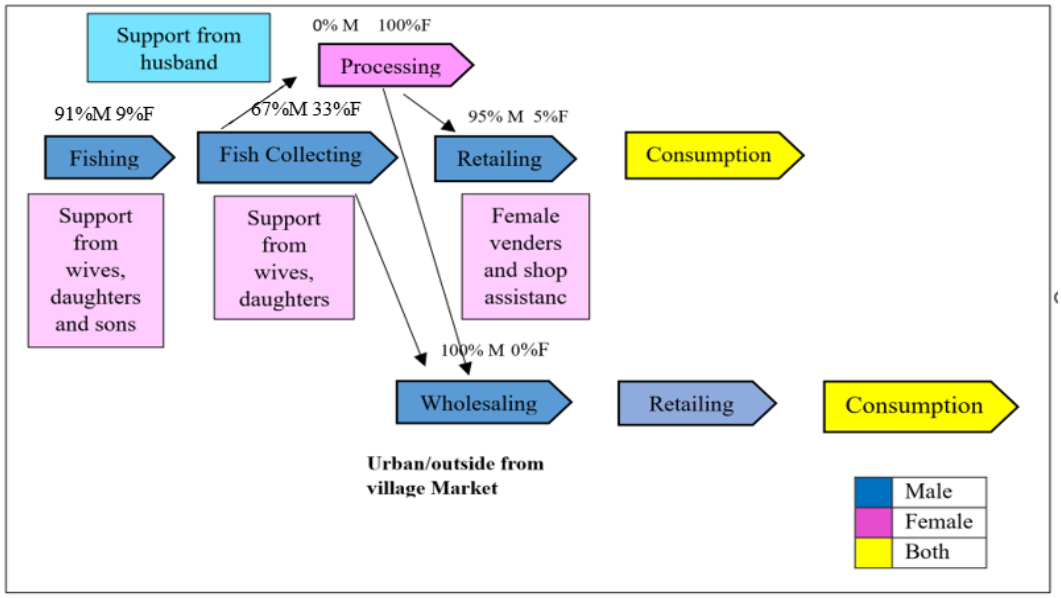

Figure 4. Gendered value chain for finfish in the five reservoirs selected for the study. M: males F: Females

[1]The fishery society maintains records for each fisher. These details include loans, which are issued for the well-being of the fishers. Fishers need to repay these loans in installments. The loans are typically used to buy fishing equipment, purchase school supplies for their children, cover festival expenses, or manage emergency situations. Other recorded details include loan repayment, membership fees, membership renewal fees, fishers' savings, and contributions to the pension.

It was also found that women support their fish vendor husbands as sales assistants. However, women do not participate in wholesale marketing activities because the wholesale vendors target city areas. They sell the freshwater fish collected in inland reservoirs together with marine fish.

Fish processing takes place during the peak fishing season, and 100% of dried fish processors were women (Figure 3). Although women were predominant in fish processing, their husbands support them in buying, transporting, cutting, or cleaning of fish. Both drying and smoking methods are used to process fresh fish in the communities studied.

The value chain of GFP is more complex than that of finfish (Figure 5). It mainly focuses on the export market, while a small proportion (damaged and rejected quality) is directed to the local market. Fishermen do not use special techniques to harvest GFP, but it is essentially a by-catch of the gillnet fishery for finfish. Accordingly, the initial node (i.e. fishers) of value chain maps of both finfish and GFP are identical. Of those engaged in the GFP primary handling stage 73% were men and of 27% were women. Figure 8 shows women engaging scaling and handling prawns at the landing site. Men also handle GFP, but women help them with this activity, especially because GFP should be handled and stored carefully to maintain the quality of the product acceptable to the buyer. As women are perceived to be patient and careful in disentangling GFP from fishing nets without damaging the animals, female support appears to be essential.

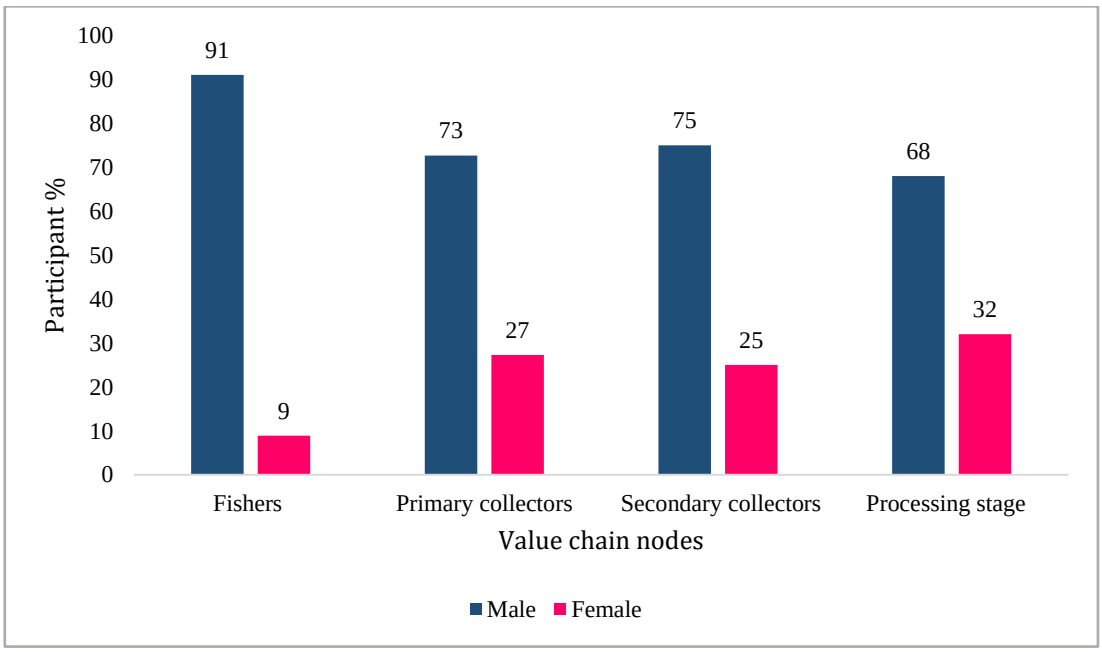

Figure 5. Male and female participation ratios in the GFP value chain

In the marketing process of GFP, women work as sales assistants, quality checkers, document handlers, and human resources managers, trainees in export companies. Generally, men are engaged in storing GFP into boxes with gel ice (packing material) and transporting (from reservoir to packing centers or packing centers to the airport). In this node it was observed that the 68% of labor was provided by men, while the female contribution was 32% (Figure 6).

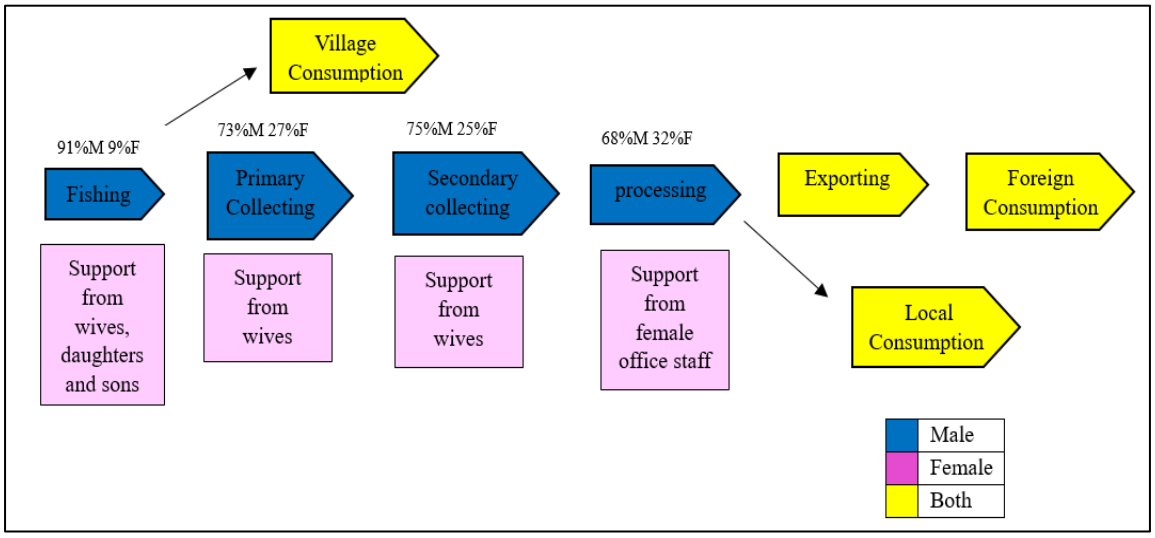

Figure 6. Gendered value chain for giant freshwater prawns, M: Male, F: Female

Figure 8. Women cleaning fishing nets (Iranamadu wewa)

Figure 7. Female collector: scaling and grading giant freshwater prawns, alongside men (Pudumurippu wewa)

Discussion

The present analysis indicated the presence of gender-specific roles in CBF across the five reservoirs studied and performed several essential functions in finfish and GFP value chains. Nevertheless, as illustrated in the 'floating coconut' model (Figure 2), many of the gender-specific roles occur within the informal sector of household economy, as well as in unpaid work in the community and leisure activities, which demonstrated underlying social and economic values that are not readily conspicuous. From the value chain mapping of finfish and GFP, it was evident that almost all nodes were dominated by males, except for finfish processing. However, these activities, in which men are predominant, are often supported by female household members.

It has been reported that in agricultural value chains, men tend to dominate roles with higher barriers to entry, leading to greater returns, and control chain management functions (Coles and Mitchell, 2011). Also, in such value chains, women occupy lower-level roles due to the factors such as limited income, skills, education and training, and access to markets and information

(World Bank, 2001, 2007; Coles and Mitchell, 2011). The present analysis of value chains of finfish and GFP in Sri Lankan reservoirs also exhibit similar patterns.

In the postharvest handling of CBF harvest, especially GFP, which requires careful handing to prevent unintended damage to the harvest, women's involvement is appreciated by fisher communities, as women are perceived to be more patient than men. During the present study, this was found to be more prominent in war-affected areas where there are female-heads of households, whose services are obtained by fishers for postharvest handing of CBF harvest upon payment of daily wages. This is especially the case in Tamil reservoir communities in the Kilinochchi district. Also, it is evident that fisher communities value the role of women for record keeping and handling accounts, as women are perceived to demonstrate honesty and commitment in these activities. This study found that more women were engaged in fisheries-related activities in Tamil reservoir communities, relative to Sinhalese or Muslim reservoir communities. However, it is not clear whether this is due to the socio-cultural differences in gender norms in general among these ethnic groups, or whether there has been a change in gender norms, due to the increase of female-headed households in war-affected Tamil reservoir communities Moreover, studies have also shown that women are engaged in fishery activities and in value chains of even female-dominated fisheries, on a part-time basis in the countries such as Melanesia (Mangubhai, et al., 2024). While there are no female-dominated fisheries in Sri Lanka, it is apparent from the field data of this study that women are engaged in fisheries-related activities in all CBF communities on a part-time basis (Ex. KIIs, 01).

Conclusions

This study aimed to examine the gender roles and opportunities in value chains in the CBF sector to assess differential contribution by men and women and explore ways to enhance benefits for women in participating in these value chains. Although men and women engaged in a range of livelihood activities, only a few are considered visible economic activities. Many activities consist of invisible tasks, considered as informal and non–economic activities. However, these activities provide underlying support for visible economic activities and are essential for the sustainability in the CBF sector. Therefore, these findings contribute to filling a knowledge gap in the CBF literature and to the need for empowering rural communities, especially women, in gaining increased benefits from CBF value chains. In the reservoirs covered by the first phase of this study, preliminary results indicated that all nodes of the fisheries value chains are dominated by men, except for finfish processing. Thus, women need more opportunities to enter the fisheries industry as processors, collectors, and vendors. As fisher communities consist of members interrelated through friendship and kinship, women are comfortable in dealing with community members in engaging in livelihood activities. In addition, as fishery related activities last only during some hours of the morning and evening, enabling the community members to get involved in other activities during the rest of the day. The opportunity costs of increasing fisheries-related activities need to be established. Fisher communities might have the advantage of balancing livelihoods and family life better, relative to other communities. This is of particular importance for women to get involved in fishery-related activities.

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Appendix:01

Questionnaire for focus group discussions (FGDs)

1. How many people are engaged in fishing related activities in your reservoir?

Nature of the activity	Number of Males	Number of Females

2. What are the paid and non-paid activities?
3. How do women support/contribute to male dominated activities?
4. How do men support/contribute to female dominated activities?
5. Is women's participation important in your community?
6. Do you consider women's involvement important?
7. What are the advantages and disadvantages of women engaging in fishery-related activities?
8. How do you spend the rest of the time after completing a fishing round. Explain.

Questionnaires for KIIs

1. Explain fish market channel (village and town area) and the selling procedure.
2. Explain the GFP market channel and the selling procedure.
3. Explain the GFP export procedure.
4. What are the important activities in your daily schedule related to both fishing and non-fishing activities, for both males and females?
5. What are the reasons for women engaging in fishing related activities?