

GENDER ROLES IN TILAPIA CAPTURE AND MARKETING SUPPLY CHAIN ON LAKE KARIBA, ZAMBIA

by

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ABSTRACT

The study looked at gender roles in the value chain for small scale Tilapia capture and marketing in villages and market centres along the Sinazongwe shore line of Lake Kariba, Zambia. Objectives were to identify dominant gender in supply chain functions, compute price changes due to value addition and isolate institutional requirements for effective marketing. Data analyzed from fisher-folks, traders, fish smokers, aggregators and retailers showed deep water fishing dominated by males with 94% of captors and shallow water fishing by females (68%). About 90% of intermediary traders and 61% of fresh fish retailers were males while females dominated fish aggregation (59%), processing (57%), distribution (69%) and smoked fish retailing (87%). One kilogramme of fresh Tilapia changed from ZMK8,000 at landing point to ZMK9,500 at trader level to ZMK13,000 at aggregation and to ZMK18,000 at final retail point. Smoked fish price per kilogramme was ZMK8,000, ZMK9,500, ZMK15,000 and ZMK19,000 at landing, trader, processor and retailer levels, respectively. Low investment in capital assets and lack of training in fish capture were identified as requiring urgent attention for increased women participation. Absence of regulatory institutions for fish quality assurance especially between captors and aggregators also required urgent attention owing to considerable fish deterioration between these points. The study concluded that women were more involved in fish smoking, aggregation and distribution but negligible in fish capture. To increase participation in male dominated activities, there is need for a female-tailored credit window to facilitate investment in fixed assets and training in deep water fishing.

INTRODUCTION

Value chains for agribusiness products attract a lot of players from input procurement to consumption just like any other agribusiness [1, 2, 3] due to a multiplicity of forward and backward linkages. Participation in value addition has been reported to benefit all players in the various nodes of the chain [4]. The Tilapia value chain has features similar to a typical agribusiness sector activity [5]. Moreover, informal sector value chains are important for their capacity to transfer incomes to a wide range of players ranging from input suppliers through producers and market intermediaries to retailers who are in contact with consumers [6]. Value chain players make their living by taking part in a business function of their choice within the chain. Informal agribusiness value chains are known to attract a lot of female participation in the primary production sector [7, 8, 9]. However, in some cases, gender roles are balanced [10] while in some cases, it is has lopsided distribution [11, 12]. Thus, understanding gender roles in agribusiness value chains is important for achieving gender mainstreaming especially as institutional requirements become necessary for full development of income generating economic ventures. Depending on cultures of respective geographical locations, gender roles are socially constructed to provide different responsibilities for males and females [13, 14, 15]. Thus, gender friendly environments need to exist in agribusiness value chains for effective discharge of roles and balanced participation of males and females. In Philippines and Mexico, women are known to actively participate in fish value chains [16, 17] due to provision of such environments.

Most of the supplies of Tilapia to major cities of Zambia come from Lake Kariba [18]. Fresh Tilapia is captured and marketed daily along the lake's shore line in Sinazongwe District. The volume of Tilapia involved is of such a magnitude that the Tilapia value chain attracts a lot of local players and players from other parts of Zambia [19] especially that it is the only lake open to fishing throughout the year in the country. These players include people of different income levels. Therefore, understanding gender roles in the value chain helps generate information on how

the chain distributes margins and benefits to participating males and females. Observations indicate that most of the fish caught with gill and drag nets is the tilapia family make returns to participation in the tilapia value chain an important source of income [20]. Moreover, since distribution of financial benefits from the value chain process across gender depends on extent of participation, it becomes imperative to understand gender roles for income enhancement and gender mainstreaming policy recommendations.

The general objective of this study was to assess gender roles in Tilapia fish capture and marketing supply chain on Lake Kariba in the Sinazongwe District of Zambia. The specific objectives were to:

- (a) describe the various stages involved in the small scale Tilapia capture fish value chain in villages and market centres along Lake Kariba;
- (b) determine the dominant gender at each node of the value chain;
- (c) identify reasons behind gender dominance at each value chain node; .
- (d) examine the major challenges to evenness of gender participation and
- (e) identify institutional requirements for balanced and effective gender participation in the value chain.

MATERIALS AND METHODS

Study area

The study was carried out using a survey of some selected fishing villages, camps and aggregation centres along Lake Kariba shore line between May and July, 2011. The Sinazongwe District shore line stretches approximately 90 kilometres but only villages within the first 60 kilometre stretch were considered due to their accessibility by road. The map of the study area is as shown in Figure 1.



From [21] Tehillah House Boat (2011) (some locations were supplied by researchers)

Figure 1: Map of study area showing Lake Kariba

Identification of respondents and data collection

Thirty (30) camps/villages were identified and 1 key informant with experience in fishing in each camp/village was identified on recommendation from the headman and interviewed. Key informants were helpful in identifying more respondents such as fishing material suppliers, processors, aggregators, traders, distributors and retailers in the supply chain. Fishing material suppliers were disaggregated into 2 subgroups, namely, those supplying locally made materials and those supplying manufactured materials. Two (2) suppliers in each category were randomly selected

and interviewed in each village. Fishing material suppliers were interviewed with the aid of a structured questionnaire.

Our processors in this study comprised fish smokers only. Five (5) fish smokers were interviewed in each fishing village/camp giving a total of 150 respondents in this category. The interviews were carried out using a pre-tested structured questionnaire.

To assess gender participation and addition to price as a result of value adding activities, fish middlemen were disaggregated into several groups, namely, traders, fresh and dry fish aggregators and distributors to other parts of Zambia. Due to diversity and very high mobility of short and long distance traders, they were studied by participant observation method at points of entry into the market and at the market centres. Ten (10) traders were randomly selected at each of the 10 entry points. A checklist of questions was used to gather data from middlemen.

Fish aggregators were categorized into fresh fish and smoked fish aggregators, owners and non-owners of refrigeration facilities and those supplying fish to other traders and commercial buyers. These were studied at the various aggregation centres and the instrument for data collection was also a question checklist. Five (5) fresh fish aggregators were randomly selected and interviewed in each of the 10 centres whereas smoked fish aggregators were interviewed along with smokers.

The retailers were, in this study, defined as those sellers at the terminal node of the value chain and were responsible for servicing final consumers. They were disaggregated into those supplying fresh fish and those supplying smoked fish. The survey instrument for this group of respondents was also a question checklist. Two (2) fresh fish retailers and five (5) smoked fish retailers were interviewed at each of the 10 markets.

Data collected

The first data set collected comprised descriptions of different activities involved in the value chain and prices per kilogramme of fish at each stage. The second comprised number of participants by gender at each stage of the value chain for each camp/village or market centre. The last set of data comprised reasons for dominance or non-dominance of a particular gender at a given stage of the value chain and suggestions for personal and institutional requirements at each stage of the value chain so as to enhance income, gender balance and mainstreaming. Altogether, 405 value chain participants were interviewed in 30 camps/villages, 10 aggregation centres and 10 markets.

Data analysis

Data on activity descriptions and prices were consolidated and summarized into a value chain flow chart. Numerical data on number of participants by gender were converted to proportions at each level of the value chain to reflect the representation of males and females such that the proportion of males and that of females participating at any supply chain node in each camp/village or market adds to 1. The proportions of respective gender were averaged and presented on pie charts.

RESULTS AND DISCUSSION

The value chain flow chart as observed in the study is presented in Figure 2. The study revealed that the value chain comprises the traditional functional stages of the agribusiness sector, namely, input supply, production and marketing sub-sectors [22].

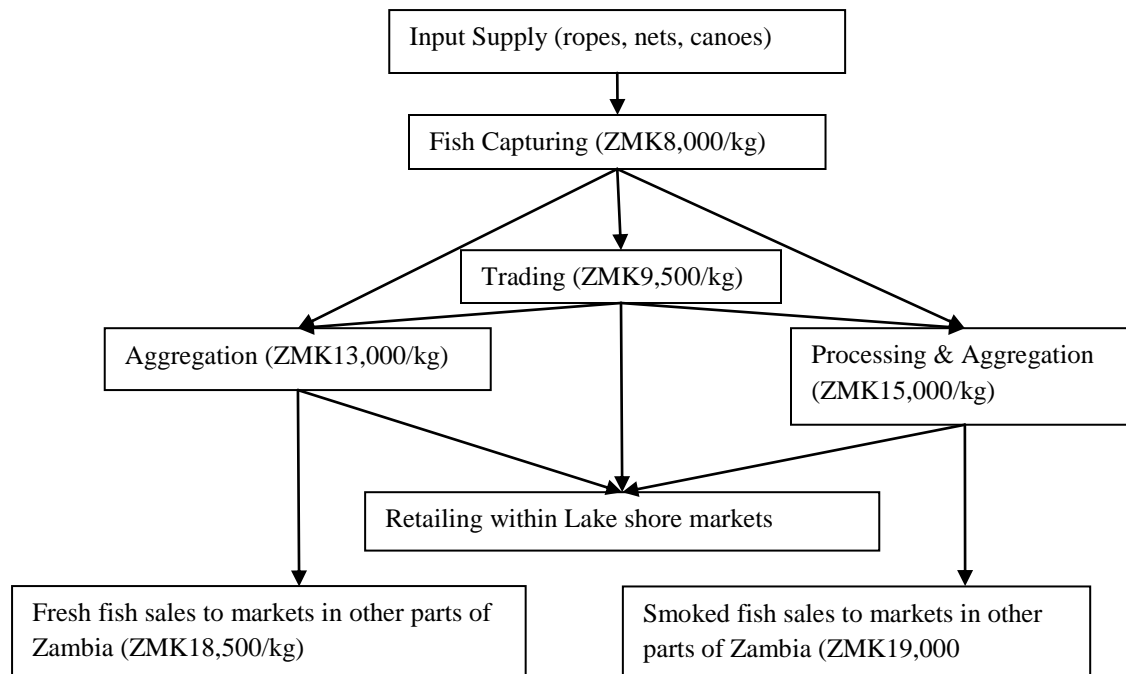


Figure 2: Components of the tilapia fish value chain (At the time of the study, USD 1.00 = ZMK5,000)

Input supply

The input supply sub-sector consisted of locally made and manufactured materials. Locally made materials were basically ropes made from polyester bags and were found in all camps/villages visited. Manufactured materials were nets, hooks and lines sourced from local shops. It is noteworthy that participation by gender was skewed depending on the type of inputs supplied. The average proportion of male participants in net supply was 96 percent whereas that of females was 4 percent as given in Figure 3. Thus, males dominated their female counterparts in ownership of shops supplying fishing nets to fisher folks.

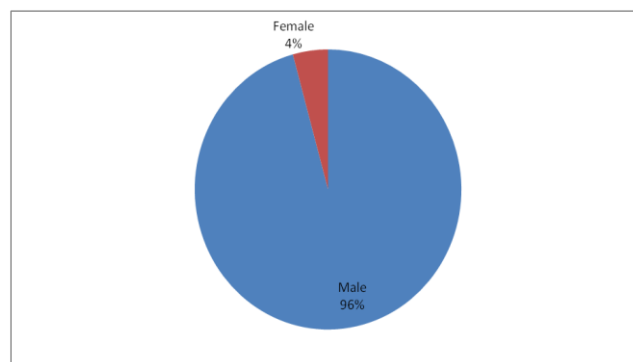


Figure 3: Comparison of males and females in fishing net supply

On the contrary, supply of ropes used with fishing nets is dominated by females (Figure 4). Participants make these lines from local materials especially used polyester bags and supply them to fisher folks at ZMK 6,000 per 100 metres of the line. It is a slow and laborious activity often taking not less than 3 days to complete a 100 metre long rope. The average proportion of female participants was 73 percent and that of males, 27 percent.

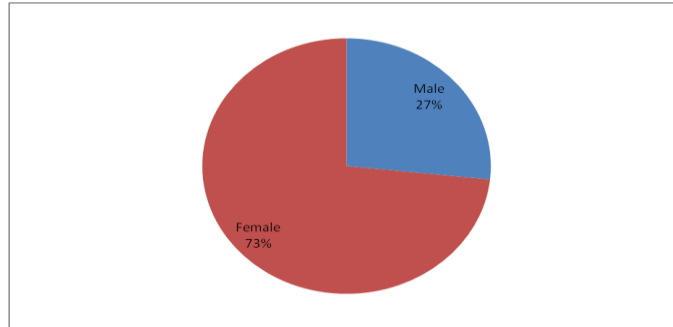


Figure 4: Comparison of males and females in fishing line supply

Our finding here is confirmed by previous findings that females are usually found dominant in activities which are both energy-sapping and low in profit yielding capability [23, 24, 25].

Fish capture

The fish capture sub-sector comprised the fishing activities. Two types of fishing observed were deep water fishing and shallow water fishing. Deep water fishing was conducted with gill and drag nets, fisher folks used boats and canoes. Captors using drag nets applied the fish chasing techniques locally called “kutumpula” [26]. Boats and canoes were used more or less communally by an average of 3 people per boat or canoe for gill net fishing, and up to 5 people for drag net fishing. Large quantities of catch were attributed to deep water fishing with part of the fish supplied on forward contracts. Shallow water fishing involved use of hooks and was conducted without canoes and boats. The average price of fish at this stage is ZMK8,000 per kilogramme of Tilapia. Moreover, participation by gender in fishing was also noted to be skewed. Dominance depended on the fishing ground in question. Males were dominant in deep water fishing as shown in Figure 5.

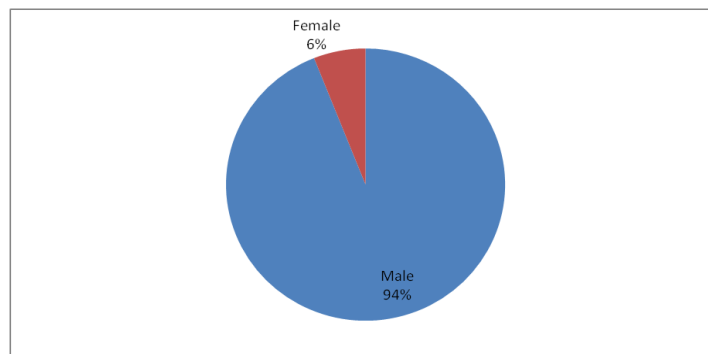


Figure 5: Comparison of males and females in deep water fishing

Males comprised 94 percent and their female counterparts accounted for the balance of 6 percent. This finding is confirmed by findings from previous studies [27]. However, preparing nets and laying them were done jointly by both genders at household level. The small proportion of women involved in deep water fishing also employed male counterparts. Shallow water fishing, however, which does not require canoes and boats, was dominated by females as revealed in Figure 6.

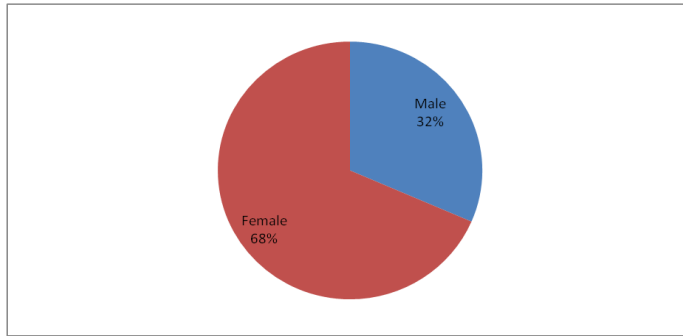


Figure 6: Comparison of males and females in shallow water fishing

Females constituted 68 percent of participants in shallow water fishing activity and males accounted for 32 percent. Although, many reasons bordering on poverty were stated for the low participation of women in deep water fishing [28], the most popular reason given for this pattern was that winds often introduce a risk in fishing with small boats and canoes which females were unwilling to take. Thus, shallow water fishing was an alternative in the absence of large boats which ensure safety. The other alternative fishing livelihood strategy in which women were preponderant was cage fishing, a kind of fish farming which women used as cooperative groups in the area but it was suspended due to environmental concerns.

Fish marketing

The marketing sub-sector consists of a wide range of participants, namely, traders, bulkers, processors, retailers and distributors to other parts of Zambia.

Traders are the major link between producers and aggregators, processors and retailers. They buy fresh fish from captors, transport it up to distances of 20 kilometres and sell it to aggregators, processors and retailers at market centres usually on forward contract arrangements. However, some traders supply fish by head potage (on foot) to markets within 3 kilometres. The average price per kilogramme at this stage is ZMK9,500, and thus, only a mark-up of ZMK1,500 per kilogramme is what is added by traders. Males dominated this activity constituting 90 percent of participants on the average whereas their female counterparts constituted only 10 percent (Figure 7).

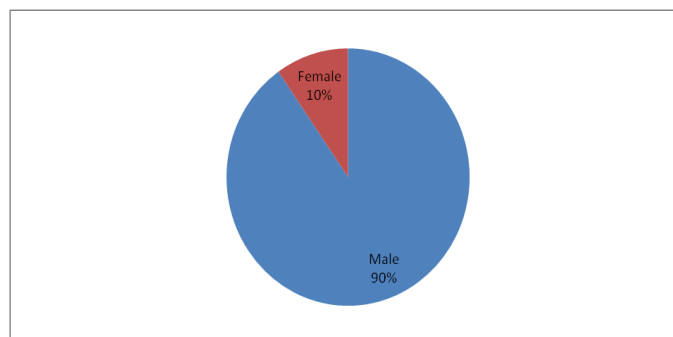


Figure 7: Composition of fish traders by gender

Use of bicycles for fish transportation and distribution was exclusively a male activity while transportation and distribution by head potage was 100 percent dominated by females. On the reason for male domination of use of bicycles for fish transportation and distribution, females claimed that bicycle riding over a long distance is not popular among females.

Aggregators

Aggregators buy fresh fish in large quantities from different traders, accumulate it and store it in refrigerated facilities. They usually have either owned or rented refrigeration facilities. The average price at this stage was ZMK13,000 per kilogramme. Thus, aggregators were adding a margin of ZMK3,500 per kilogramme to the value chain in excess of the cost of procurement from traders. However, some aggregators who procured directly from captors added ZMK5,500 per kilogramme as their mark-up. Thus, in this study, aggregation was one of the most attractive value-adding activities.

Fresh fish aggregation was dominated by females as shown in Figure 8 although males had a significant share.

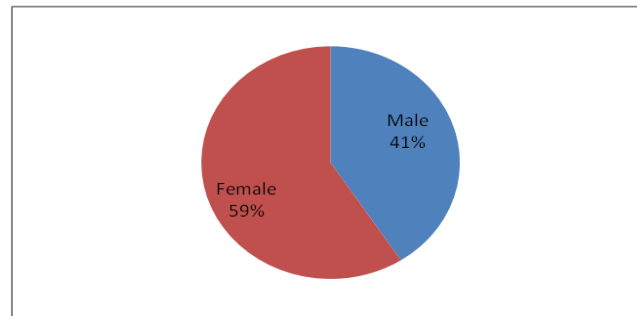


Figure 8: Composition of fish aggregators by gender

Females comprised 59 percent of players in this activity as compared to the 41 percent of their male counterparts. The dominance of females in fresh fish aggregation was attributed to support by working spouses for either acquiring own shop or renting one from shop owners. Some 18 percent of female aggregators owned refrigeration facilities whereas 82 percent depended on renting. Thus, owning refrigeration facilities was a big challenge for many females. Almost 68 percent of males owned either shops or homes with refrigerators.

The second challenge was failure to sell all the fish aggregated due to some deterioration in some of the aggregated fish procured. This problem emanated from lack of quality assurance of the fish supplied by traders and introduced financial risks to aggregation as a value adding activity.

Processors

Processors were involved in smoking the fish and packaging it in bundles for either retailing or wholesaling. Thus, they were also aggregators found mostly in areas without refrigeration facilities. Smoked fish cost ZMK15,000 per kilogramme, and thus, processors were adding a margin of ZMK5,500 per kilogramme on fresh fish procured from traders and ZMK7,000 on fish directly procured from captors. This margin is comparable to the margin reported for processors of cassava products in Nigeria [29]. This margin could be considered as relatively high in the opinion of the authors since they procured fish directly from captors. However, aggregation requires a much longer period of ownership and title taking to process the fish to marketable volumes while the processing activity *per se* was also labour intensive.

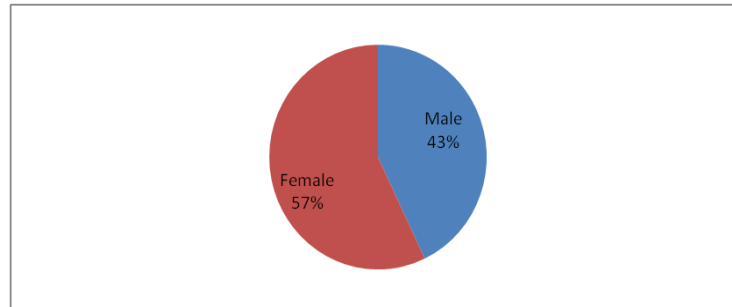


Figure 9: Composition of fish processors by gender

Fish processing was dominated by females constituting 57 percent of the respondents as shown in Figure 9. However, males had a considerable share of 43 percent. The heavy female involvement in processing had earlier been reported by [30], who further indicated that some processors took up to 2-3 months to assemble intended quantities of fish in some cases. Thus, the process is labour intensive and time consuming. The other challenge reported was the slow pace at which smoked fish was sold.

Local retailing

Retailers were found in local markets which also served as aggregation centres for fresh fish due to their well-functioning rural electrification infrastructure. These markets were located at Maamba, Sinazongwe, Fisheries Training Centre, Ngoma Fishing Camp, Sinazeze, Sialwala, Siabaswi, Siansowa, Buleya Malima and Buchi Farms. Retailing centres were seen to have available for sale, both fresh and smoked fish.

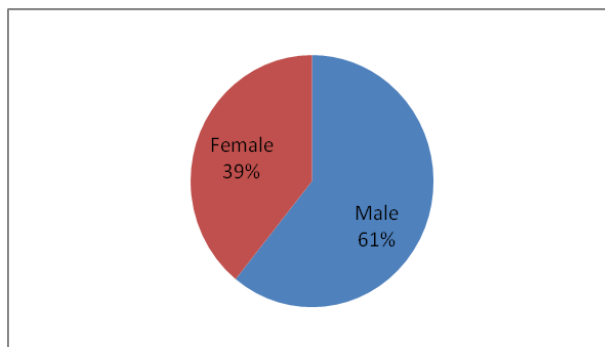


Figure 10: Composition of fresh fish retailers by gender

Local market retailing was of two types, namely, fresh fish and smoked fish retailing. Fresh fish retailing was dominated by males who owned refrigerated facilities. In this case, males constituted 61 percent while their female counterparts constituted 39 percent of participants as displayed in Figure 10. The major clients were commercial fish retailers from other towns and cities. However, the price was much lower than if they had distributed the fish on their own.

Conversely, smoked fish retailing was dominated by females who comprised 87 percent of the participants as shown in Figure 11.

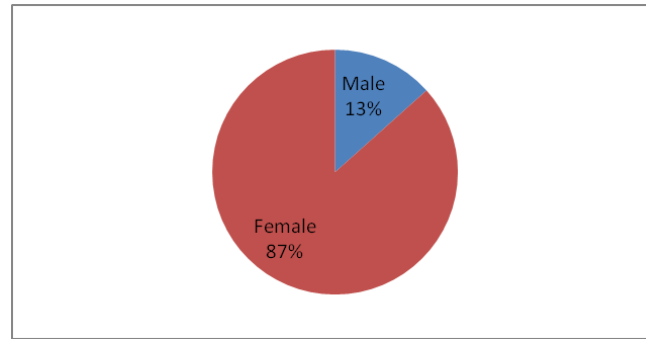


Figure 11: Composition of smoked fish retailers by gender

Males constituted the remaining 13 percent. The striking observation here was that although women did not cover long distances to market fresh fish using bicycles, they covered more or less the same distance to market smoked fish. This they attributed to lower losses, owing to the lower degree of perishability being experienced in smoked fish retailing compared with fresh fish retailing.

Distribution to major centres

Fish distribution to other parts of Zambia was another important activity in the area. Distributors from local market centres passed through Sinazeze only. Distributors of fresh fish to other parts of Zambia sold it at ZMK18,500 per kilogramme in Lusaka, thereby adding a margin of ZMK 5,500, the largest margin following the landing price charged by fisher-folks. This activity was largely performed by females who comprised 69 percent of the sample compared to 31 percent for their male counterparts (Figure 12).

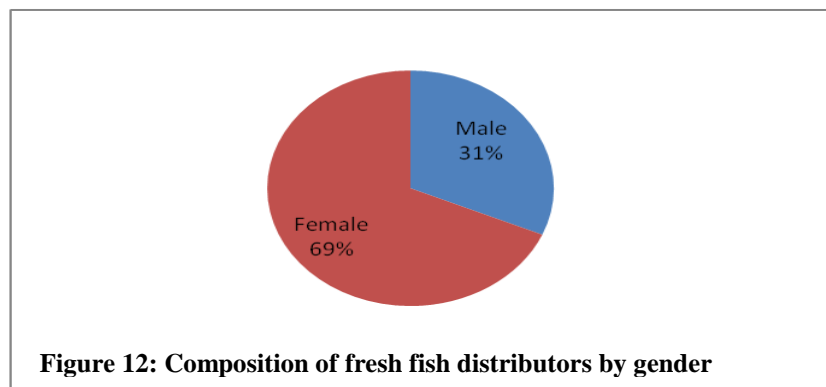


Figure 12: Composition of fresh fish distributors by gender

The major challenge in fish retailing was the problem of transporting fresh fish without refrigerated vehicles which introduced a physical risk of product deterioration especially if the fish did not sell quickly. Fish deterioration leads to price reduction in order to ensure total disposal of fish especially when quality of fish supplied by traders could not be assured.

Smoked fish distributors to cities added a further margin of ZMK4,000 per kilogramme of fresh fish over the ZMK15,000 charged by processors. The activity was said to be slow selling with some 82 percent of both fresh and smoked fish retailers responding that smoked fish sold more slowly than fresh fish, and its price depended on quality and size of the fish. Women dominated smoked fish distribution with a 55 percent share compared to 45 percent share by the male counterparts. Thus, when compared to proportion of processors, female distributors decline

slightly whereas that of males increases. This could be attributed to some males purchasing aggregated fish from female counterparts.

CONCLUSION AND RECOMMENDATIONS

The value chain for Tilapia fish landed in Lake Kariba showed at least seven value adding stages through which income is distributed to participants. Financial margins depended on the stage of the value chain, the margin charged for value addition as well as quantity of fish marketed per unit time. Beginning with the landing price of ZMK8,000 per kilogramme, the highest margin was ZMK5,500 per kilogramme added by processors and long distance fresh fish distributors. Smoked fish distribution ranked second with a ZMK4,000 mark-up. Fresh fish aggregation was third with a mark-up of ZMK 3,500 per kilogramme of fish. Trading was least in terms of value addition with only a mark-up of ZMK1,500 charged per kilogramme of fresh fish.

The study revealed that females dominated the supply of locally made fish lines in the chain. They also dominated the shallow water fishing, aggregation, processing and distribution to major centres that were far away from the shore line. Males dominated the net supply function, deep water fishing, trading and fresh fish retailing. Results of data analysis showed that females were preponderant in those functions requiring high labour intensity and lower financial returns. An example is shallow water fishing which requires more time and patience to catch fish with hooks. Processing was reported to take a lot of time and effort to accomplish. Dry fish retailing also requires a lot of time since it sells much more slowly than fresh fish. Supplying fish to centres away from the lake is risky because of lack of refrigerated facilities, especially when fish does not sell quickly.

The major challenges observed that led to lopsided distribution of male and females in those activities dominated by males were lack of required fixed assets for effective participation by women. Another issue was the lack of regulatory framework for quality assurance of fresh fish procured from traders. Large fishing vessels for deep water fishing, bicycles for trading and refrigeration facilities were major assets being preferably owned by females. Another challenge is lack of training for women in deep water fishing which can lead to their increased participation.

The study recommends inclusion of quality assurance mechanism in the value chain process to protect fresh fish aggregators, distributors, retailers and consumers. It is recommended that government commences an inspection scheme for quality assurance in fresh and smoked fish marketing as is being done for meat in Zambia.

Female participation in deep water fishing needs to be encouraged. The alternatives suggested were facilitation in acquisition of large fishing boats and introduction of cage fishing in locations where wind does not pose a serious risk. Although this activity was suspended for environmental concerns, it could still be re-introduced in identified areas to encourage women participation. Women were missing out on the opportunity to earn from the high returns to fishing effort which gave the largest price per kilogramme of fish sold in this study. Increased women participation in cage fishing will also guarantee fish capture in periods when the Lake would be closed for fishing in future following government's pronouncement.

Fresh fish aggregation and distribution to large cities is practiced largely by women linked to middle class people in formal employment. This leaves out most of the women not connected to middle class people. Since processing is an important alternative activity for females who do not own refrigerated facilities, training in improved fish smoking and marketing techniques should be conducted to empower more of them economically.

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