

Role of Women in Fish Processing at Msaka Beach in Mangochi District, Southern Malawi

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Abstract The study aimed at determining fish processing techniques and factors that influence involvement of women in fish processing in Malawi. Systematic random sampling was used to select a total of 89 women who were interviewed using a structured questionnaire. Data was analyzed using Statistical Package for Social Science (SPSS). Frequency tables was used to show the number of women involved in fish in processing while cross tabulations were used to show relationship between factors that influence involvement of women in fish processing. Chi-square () test was used to show the significant differences between factors that influence involvement of women and processing techniques. The study found out that a majority of women (82%) process fish through sun-drying while a few parboils (4%), smoking is done by (2%) and(1%). sell fresh fish. Lack of fish processing materials mainly firewood appears to be the major drive towards use of sun-drying. Furthermore, level of education, marital status and household size were the factors that influence involvement of women in fish processing.

Keywords Fish processing; Women; *Engraulicypris sardella*

1 Introduction

Fish account for nearly one quarter of the words supply of protein which improves health condition of human beings (Costa-piece, 2005). Globally, fish processing is usually categorized as full processing or semi-processing. Women are usually involved in semi-processing due to huge capital investment that is required in full processing than in semi-processing (Nayak, 2000). Processing is done to preserve and improve the flavor of fish Processed fish has different taste influenced by the technique of processing and that provides a wide range of consumer preferences (Lwenya and Abila, 2000). Women employ different processing techniques among which are; smoking, sun-drying, salting and frying.

About 85% of the population in Malawi live in rural areas (World Fact Book, 2002) and over 65% people live below poverty line. Fish provides the most affordable quality source of dietary animal protein (MRSP, 2005). More than 50,000 fishers are directly involved in fisheries sector and 350,000 people are either involved in fish processing, fish marketing and other related activities and women are underrepresented in the processing activities (Common Wealth/GTZ, 2007). An estimated 90% of fish caught in Malawi is processed into various fish products. However, processing facilities at most beaches are poor and inadequate (Hara, 1996).

The main problem in fish processing is that there are low levels of women participation such that women are underrepresented (Common Wealth/GTZ, 2007). Most women in the developing world especially Africa spend time in doing household chores and taking care of children. Some cultural beliefs confine women to just get married produce and take care of children without doing any activities that can generate income (FAO, 2012). Low levels of education and skills in fish processing (UN Report, 2003) hinders most women participation in fish processing. In addition, inadequate funding to empower women to participate in fish processing activities and access to soft loans to enable women purchase different storage facilities and processing materials (Van de Ban, 2004) contributes to low women participation in fish processing. Finally, there is lack of training as refresher courses to women processors both locally and internationally to improve fish processing activities which would

into tap into their indigenous knowledge in fish processing.

Low levels of women participation in fish processing has negatively affected most Malawian fishing communities. As a result, most families are food insecure which leads to poor health that eventually lead to malnutrition, early marriages arising from ultra poverty (FAO, 2012) and high school drop outs as a result of low income.

Therefore, the present study aimed at analyzing the role of women in fish processing, determine fish processing techniques employed by women and factors that influence involvement of women in fish processing.

2 Materials and Methods

2.1 Study area

The study was conducted in March, 2014 at Msaka beach in South West Arm (SWA) of Lake Malawi at Monkeybay in Mangochi district. Mangochi is in the Southern region of Malawi covering an area of 6, 273 km² with a population of 610, 239 (Go M., 2009). The study area was chosen because there are a lot of fishing activities that take place in the area.

2.2 Study population and Data collection

The study used primary data which was collected through administration of questionnaire. Systematic random sampling technique was used to select the respondents to the questionnaire where a total of 90 women were sampled.

The questionnaire constituted both open and closed questions. Both qualitative and quantitative data were collected. Qualitative data constituted the thinking of women on fish processing and quantitative data included number and age of women. The questionnaire constituted social demographic factors which included; age, marital status, household size, level of education, employment, access to loan, participation in associations and contact to extension agents.

2.3 Data analysis

The data was analysed using Statistical Package for Social Science (SPSS) where descriptive statistics such as frequency tables, percentages and graphs were generated to show fish processing techniques employed by women. Frequency tables were also used to show the number of women and preferred processing techniques. Cross tabulations were used to show relationship between factors that influence involvement of women in fish processing techniques. Chi-square test was run in order to determine whether significant differences exist between the factors that influence involvement of women and processing techniques.

3 Results

3.1 Fish processing techniques employed by women

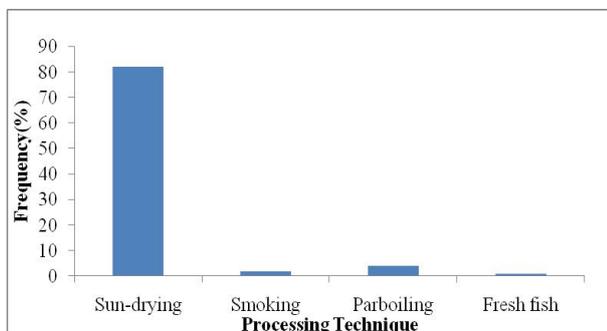


Figure 1 Processing techniques for *Engraulicypris sardella* (Usipa) employed by women

Results indicate that most (82%) women at Msaka beach process their fish through sun-drying technique while a few (2%), smoke parboil (4%) and sell fresh (1%).

3.2 Factors that influence involvement of women in fish processing Age

The study found that most women involved in fish processing were between the age groups of 20-30, 30-40 and 40-50 years old with a representation of 90.5%, 91.3% and 94.1% of the respondents respectively. However, chi-square test indicated no significant differences across age group on using fish processing techniques ($\chi^2 = 0.410$).

Table 1 Age of women and fish processing techniques:

Age range	Fish processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
20-30	90.5%	0	7.2%	2.4%
30-40	91.3%	4.3%	4.3%	0
40-50	94.1%	14.3%	0	0
50-60	85.7%	14.3%	0	0

3.3 Marital status

The results show that 75% single women use sun-drying technique and parboiling, none use smoking and fresh form processing techniques. Married women; 93.7% women use sun-drying technique, 1.3% use smoking technique, 5.4% use para-boiling and none use fresh form.

Widow women; sun-drying(71.4%), smoking and fresh form (14.3%) and none use parboiling. Chi-square test indicated significant differences between marital status and processing techniques ($\chi^2 = 0.008$).

Table 2 Marital status of women and fish processing techniques:

Marital status	Fish Processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
Single	75.0%	0	25.0%	0
Married	93.7%	1.3%	5.1%	0
Widow	71.4%	14.3%	0	14.3%

3.4 Household size

Household range of 1-5: 91.7% women use sun-drying, none use smoking, 5.6% use parboiling and 2.8% use fresh method. 6-10 household range; sun-drying (95.9%), smoking and parboiling (2.0%) and none preserve in fresh form.

Table 3 Household size of women and fish processing techniques:

Household range	Fish Processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
1-5	91.7%	0	5.6%	2.8%
6-10	95.9%	2.0%	2.0%	0
11-16	50.0%	25.0%	25.0%	0

In 11-16 household range, sun-drying (50.0%), smoking and parboiling (25.0%) and none use fresh method.

Chi-square tests indicates significant differences between household size and processing techniques ($\chi^2 = 0.010$).

3.5 Level of education

More women (94.0%) of primary level use sun-drying, 1.5% use smoking, 4.5% use parboiling and none use fresh method. Secondary level; 85.7% use sun-drying, none use smoking and parboiling while 14.3% use fresh form method. Chi-square test indicated significant differences ($\chi^2 = 0.031$).

Table 4 Level of education and fish processing techniques

Education level	Fish Processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
Primary	94.0%	1.5%	4.5%	0
Secondary	86.7%	6.7%	6.7%	0
Not educated	85.7%	0	0	14.3%

3.6 Employment

Results indicated that employed women (50.0%) of respondents used sun-drying technique and para-boiling, none used smoking and fresh form. Un-employed women; 92.0% used sun-drying, 2.3% used smoking, 4.5% used para-boiling and 1.1% used fresh form processing technique. However, chi-square test indicated no significant differences between employment and fish processing techniques ($\chi^2 = 0.993$).

Table 5 Employment and fish processing techniques

Employment	Fish Processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
Yes	50.0%	0	50.0%	0
No	92.0%	2.3%	4.5%	1.1%

3.7 Access to loan

95.7% of women that used sun-drying technique had access to loan and 88.1% had no access to loan, smoking technique; 2.1% women had access to loan while 2.4% had no access to loan, para-boiling; 2.1% women had access to loan and 7.1% had no access to loan. On fresh form method, 2.4% had no access to loan. However, there were no significant differences between access to loan and processing activities ($\chi^2 = 0.474$).

Table 6 Access to loan and Fish Processing Activities:

Access to loan	Fish Processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
Yes	95.7%	2.1%	2.1%	0
No	88.1%	2.4%	7.1%	2.4%

3.8 Participation of women in associations and processing activities

The study found out that 93.2% of women involved in participation of associations used sun-drying, 1.4% (smoking), 5.5% (para-boiling) and none used fresh form technique to preserve *E. sardella*. On the other hand, 85.5% of Women that do not participate in any associations but only involved in fish processing techniques used sun-drying, 6.3% smoking and fresh form technique and none use para-boiling. On the other hand, chi-square test indicated no significant differences between participation of women and fish processing techniques ($\chi^2 = 0.076$).

Contact with extension agents on fish processing techniques.

The study also found out those 97.1% women that used sun-drying had contact with extension agents while 88.9% women had no contact with extension agents. 3.7% women that used smoking had no access to extension agents,

para-boiling; 2.9% had access and 5.6% had no access to extension agents and fresh form, 1.9% had no access to extension agents. However, chi-square test indicated no significant differences between contact to extension agents and fish processing techniques ($\chi^2 = 0.485$).

Table 7 Participation of women in associations and fish processing techniques:

Participation	Fish processing Activities			
	Sun-drying	Smoking	Parboiling	Fresh fish
Yes	93.2%	1.4%	5.5%	0
No	87.5%	6.3%	0	6.3%

4 Discussion

Processing techniques employed by women at Msaka beach in Mangochi district.

Results show that 82% (figure 1) of the women involved in fish processing techniques at Msaka beach use sun-drying to process *E. sardella* (Usipa). This could be because most of the women do not have enough facilities to use other processing techniques. Okorley (2007) observed that most of the women fish processors have little capital such that they cannot afford to meet necessary requirements for other processing techniques. For example, smoking and parboiling require firewood and labour to process the fish which incurs high costs as compared to sun-drying.

1% (Figure 1) of the women preserves *E.sardella* in fresh form. Lack (1%) of preservation of fish in any form could be attributed to the fact that there is no electricity at Msaka beach. Block ice is sold at Malawi Development Corporation (MALDECO) which is about twenty kilometers from Msaka beach as such most women cannot afford to purchase block ice to keep *E.sardella* in fresh form due to transport costs and lack of financial power to procure ice. Kolawole (2010) reported that most women prefer to process the fish rather than keeping the fish in fresh form due to lack of storage facilities. Njai (2000) also noted that where there are limited ice supply and cold storage facilities at the landing sites access to block ice is very expensive, and as such fish is smoked or dried for preservation. Lack of ice production facilities close to major coastal fishing centers increases the cost of ice for operators who have to transport it long distances.

4.1 Factors that influence involvement of women in fish processing age

More women participate in fish processing irrespective of their age (Table 1). Some women hire a crew of fellow women to process the fish whilst they patronize the whole process. The results of the current study agree favorably with Yarhere (2009) who found out that most women participate in fish processing irrespective of their age and the age usually ranges from 20 – 60. In other perspective, however, the results of the present study contradict with Kolawole (2010) who reported that the use of fish processing techniques by women is affected by age because the older the woman the less likely the use of indigenous fish processing techniques due to physical weakness because of senility. However, the present study observes that older women use more of the indigenous fish processing techniques as they have experience.

4.2 Marital status

The present study observes that most of the women processors were married followed by divorced and single women (Table 2). This could be because married women have responsibilities on their families and would venture into the business to improve the standard of their families. They can use family labour to cut down expenses on labour and the women would also have support on monetary issues from their husbands as compared to women who are single and widow. Single women would have to hire people as labour to help in processing the fish, if some single women do not have enough capital then they would not venture into the business as they do not have supporting financial muscle.

The findings of the present study are in line with Okwu (2011) who reported that most of the fish processors are

settled families with responsibilities. These responsibilities would likely make them willing to seek innovations so as to increase their standard of living.

Elsewhere, Jaji (2013) observes that in Nigeria, most married women are involved in fish processing techniques because of importance attached to marriage in most societies. This result is consistent with the opinion of Ekong (1988) that Nigerian society places a high premium on marriage and by age 25 most rural women are married in most communities. In the same vein, Jibowo (1992) asserts that the vast majority of the adult population of any society consists of married people. Marriage is paramount to the continuous existence of man and the sustenance of the society, since members of a society have to form families through procreation.

Marriage makes available the support of the spouse in the fish processing activities, especially when viewed along the findings of Adeokun (2000) who reported that most of women (fish processors) were wives to fishermen (husbands) as the latter turned the catch to their wives to process and sell the fish.

4.3 Household size

Results (Table 3) of the current study indicate significant differences between household size and involvement of women in fish processing techniques. This is so because the larger the number of households, the more labour will be available that will help the women to carry out processing techniques without incurring labour costs. In this way, labour costs are saved as family labour is used instead of hiring other people. This is an encouragement to women with large household size to get involved in fish processing techniques as labour is already available despite having capital.

On the other hand, women with small household size will likely face problems of labour costs since they have to hire people to help them in processing the fish. If such women have low capital, most of them will not get involved in fish processing techniques because they have to incur more costs in both purchasing fish at the beach and labour cost to help in processing.

Results (Table 3) of the present study compare favorably with Okwu (2011), who observed that large family sizes tend to have more hands (family labour) that make work in carrying out fish operations easier. The results also corroborates the findings of Agbum (2000), who reported that the number of persons in a family paves way for use of a family labour.

Kolawole (2010) observed that women with large family households tend to reduce cost of labour as they make use of the family members in processing activities.

4.4 Level of education

Results (Table 4) show that there are significant differences between level of education of the women and involvement of women in fish processing techniques. Most women with high level of education will not be interested to join business of processing fish, instead they will look for white collar jobs in town. At the same time, some women with high level of education will easily adopt improved fish processing techniques because they can easily understand advantages of using improved processing techniques than Indigenous Fish Processing techniques (IFPs). On the other hand, women with low education will be involved in IFPs. The results (Table 4) show that majority of the women involved in fish processing had primary education while few women had secondary education and no education.

Mwadzaangati (2013, unpublished) suggested that people with higher level of education would not prefer to be involved in the fishery activities due to knowledge and would look for white collar jobs in town, whilst those with low education would venture into the fishery as the only means for earning a living.

The result compares favourably with Lawal and Idega (2004), who observed that the level of education determine, to a larger extent, the strategies which the processor may use to adopt new innovations without difficulties thus increasing the profit margin of their fish businesses.

4.5 Employment

Majority of women involved in fish processing are not employed and few of the women are employed (Table 5). The present study shows (Table 5) that there are few formal job opportunities such that most of the women are not employed but rather involve themselves in fish processing techniques. Boohene and Peprah (2012) observed that most women engage in non-farm income generating activities because they are not engaged in formal wage employment.

4.6 Participation of women in associations

Women can participate in associations and at the same time get involved in fish processing activities without the two activities interfering each other. Participation of women in associations or cooperatives helps them to acquire knowledge that enable them manage operations involved in fish processing. However, in contrasting views, Kolawole (2010) observed that involvement of women in fish processing activities is not really influenced by participation of women in different associations or cooperatives as they gain experience and knowledge in managing the processing operations itself over time.

4.7 Access or contact to extension agents

According to results (Table 6) of the current study, most of the women do not have access to extension services because the department of fisheries does not send extension workers to their areas to teach them. Women who belong to fisheries groups have access to extension services while those who do not belong to fisheries group do not have access to extension workers. Women who belong to fisheries groups complain that extension workers do not visit them frequently in some instances they usually visit them once in three months as such they do not benefit much from the extension services offered by the extension workers and they do not see improvement in the processing techniques just as equal to those that do not have access to extension services.

The present study has revealed that there is lack of extension agents from the fisheries department to advise and teach women on how to conduct different fish processing techniques and provision of improved fish processing techniques over the Indigenous Fish Processing techniques (IFPs). Despite having no access to extension services, women still participates in the fish processing operations. Women use vocational knowledge to carry out different processing techniques to process fish. The results of the present study (Table 7) are in line with Kolawole (2010) who concludes that the more an individual has contact with extension agents, the more the use of IFPs by the fish processor perhaps as a result of the technical advice and support given by the extension agents.

5 Conclusion

Based on the findings of the study it was found out that women who are involved in fish processing techniques use sun-drying, smoking, para-boiling and fresh form in processing the popular *Engraulicypris sardella* (Usipa). Sun-drying is the most used processing technique followed by para-boiling and smoking while fresh form is the least in use.

The study has also found that; the level of education, marital status and household size are factors that influence involvement of women in fish processing.

Recommendations

The study recommends that the government of Malawi through the department of fisheries should send extension agents to visit women involved in fish processing regularly to teach them on how to conduct the processing activities to increase shelf life and avoid compromising the quality of the fish. Secondly, the study encourages credit lending institutions like commercial banks should also come up to provide soft loans with minimum interest rates to women fish processors at lower collateral so that more women can venture into the business of fish processing.

Lastly, the government of Malawi through the department of fisheries should advocate for improved fish processing techniques so that women involved in fish processing can adopt the improved fish processing

techniques. For example; use of solar driers and improved fish smoking kilns.

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