



International Journal of Fisheries and Aquatic Studies

E-ISSN: 2347-5129
P-ISSN: 2394-0506
(ICV-Poland) Impact Value: 5.62
(GIF) Impact Factor: 0.549
IJFAS 2017; 5(3): 447-450
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www.fisheriesjournal.com
Received: 29-03-2017
Accepted: 30-04-2017

Hamza ME

Institute of Marine Research,
Red Sea University, Port Sudan,
Sudan, Northern Africa

Mohamed SY

Faculty of Marine Sciences and
Fisheries, Red Sea University,
Port Sudan, Sudan, Northern
Africa

Elhasseen IM

Faculty of Economics and
Administrative Sciences, Red Sea
University, Port Sudan, Sudan,
Northern Africa

Assessment of fish consumption in the Red Sea State, Sudan

Hamza ME, Mohamed SY and Elhasseen IM

Abstract

This study aimed to assess fish consumption and fish products preference in the dietary pattern at household level in the Red Sea State, Sudan. The study adopted the analytical descriptive approach to verify and specify the research issues quantitatively and qualitatively. It depended on questionnaire and personal communications as primary sources for data collection; literature from previous studies and records were used as secondary sources of data. Results obtained indicated that about 93.8% of the population under the study was used to have fish in their diets. Significant correlation was found between children malnutrition and fish consumption in the population under the study ($p \leq 0.017$). In the study area the average fish consumption per capita reached 9.6 kg per annum. Highly significant correlation was found between the average monthly income of the family and the rate of the fish consumption ($p \leq 0.00$). The study indicated that about 62.1% of the population under the study used to eat traditional processed fish food (Fasiekh, Maloha) and about 61.5% used to have canned fish products.

Keywords: Fish consumption, food security, Red Sea, Sudan

1. Introduction

Along the coasts of the world's seas and oceans and the shore of rivers and lakes, millions of people live in communities dependent upon the productive, nourishing bounty of fisheries. In many countries the role of fish and other marine species in maintaining household food security with this nutritive commodity is obvious. For coastal communities, fish is an important income generating source [1]. It is estimated that over 200 million Africans consume fish on a regular basis [2]. Despite its high importance, most African countries lack essential statistics on the current status and potential contribution of fishery resources to livelihoods and food security [3].

Sudan has a total coastline of 853 km, and a continental shelf area of 22 300 km², its territorial rights on the Red Sea extend to an Exclusive Economic Zone (EEZ) of 91 600 km². These waters are rich in fisheries resources and also possess abundant coral populations [4]. The Sudanese marine fishery is largely coastal in nature and employs mainly traditional gear, traditional craft such as papyrus rafts and dugout canoes, and traditional harvesting techniques, whereas the marine commercial fishers use purse seiners and small- and medium-size trawlers to exploit the resources within and beyond the continental shelf area. Fish landings are generally dominated by teleostic and cartilaginous species, including sharks, anchovy, tuna, sea bream, and snapper, as well as by crustaceans and molluscs including cephalopods [5].

According to Sudan livelihood profiles (Jan.2015) [6], coastal fishing zone comprises the settlement along the Red Sea coast, where fishing is the basis of livelihood. This semi desert environment with sandy soils receives only 50-100 mm of coastal winter rainfall between November and January each year. Rain fed cultivation is impossible. Even where there is some groundwater, the soil is too salty for successful garden crops. Despite of these difficulties, some cultivate small plots with vegetables mainly cucumber and watermelon, in coastal plain using rain water runoff from the Red Sea Hills. No sheep and cattle live in this zone as adequate grazing land is not available or within migration distance; however, goats and camels thrive browsing the coastal scrub.

Though fish is available, it is a less preferred food for the majority of this culturally mixed population. Fish is, collected by traders along the coast and sold in Swakin, Port Sudan and also Khartoum. Fish is transported to the market in privately-owned refrigerated vehicles to maintain freshness.

Correspondence

Hamza ME

Institute of Marine Research,
Red Sea University, Port Sudan,
Sudan, Northern Africa

The fish are bought from villages by middlemen, who then obtain far higher prices at the fish markets. The main limiting factor for poor households in this value chain is the limited resources to invest in rental or purchase of refrigeration facilities.

Significant losses occur due to poor refrigeration, which affects the quality and marketability of fresh fish to be sold in distant markets such as Kassala, Al Qadarif, and Khartoum. As a result, fishing offers a marginal livelihood for much of the population, and very few other local options exist for income generation [6]. UNIDO (2009) [7] concluded that fisheries along the Sudanese Red Sea were traditional, of small scale and subsistence activity, which poorly serves the market and the producer.

2. Material and Methods

2.1 Study area and duration

The study was conducted in Port Sudan and Swakin localities-Red Sea State in the period from December 2014 till June 2015.

2.2 Data collection

A questionnaire was designed to collect data on fish consumption; it was composed of two parts: The 1st Part was personal and demographic data of the sampled population. The 2nd part was primary data concerning household fish consumption.

2.3 Sampling techniques

The field survey was conducted in Swakin, central and southern Port Sudan. The total number of families in the study area was 96675 according to Sudan Census (2008) [8]. The sample was selected randomly with expected level of response 50%, confidence limits 95% with error level 0.05s [9]. The sampled population accordingly was 662 families from the four sectors.

2.4 Data analysis

SPSS program was used to analyze the collected data.

3. Results and discussion

3.1 Characteristics of the sampled population

The age structure of the sampled population (table 1) showed that 85.2% of them were within the age between 30 to >50 years.

The education status of sampled population (table 2) reflected that about 7% were illiterate, 6.8% could read and write (khalwa), 24.8% completed primary school, 35.4% with secondary school certificate, 23.9% were university graduates and 2.1% were postgraduates.

The results revealed that 82.5% of the sampled population was married. Those who were bachelors 9.1% divorced 2.4% and widowed 5.4% (table 3). These figures match well with original population under study and reflect the attitude of the community to build settled families. The study indicated that 3.3% of sampled population have handicapped child, while about 0.6% suffering from malnutrition, however, significant correlation was found between children malnutrition and fish consumption in the population under study ($p \leq 0.017$).

The livelihood pattern for the studied population (table 4) indicated that 7.1% are workers and 27.3% are employees. Those who with the free business were 37.4% and 28% were from the informal sectors or other casual work and 0.2% non-working. This reflected very broad sector distribution;

however, all the categories mentioned above are consuming fish in their diet.

Table 1: Age structure of the sampled population

Age group	% of sampled population
<18	0.4
18-<30	14.4
30 - <40	30.5
40- <50	26.8
>50	27.9

Table 2: Education status of sampled population

Description	% of sampled population
illiterate	7.0
Khalwa	6.8
Primary School	24.8
Secondary	35.4
Graduate	23.9
Post Graduate	2.1

Table 3: Social status of sampled population

Description	% of sampled population
Married	83.0
bachelors	9.1
Divorced	2.4
Widowed	5.5

Table 4: The livelihood pattern of sampled population

Description	% of sampled population
Workers	7.1
Employee	27.3
Free business	37.4
Informal worker	28.0
Non-working	0.2

3.2 Fish consumption

Results indicated that about 66.4% of the population under the study used to have meat in their diets, while 93.8% used to have fish in their diet. This indicated higher preference of fish to meat. However, fish and fish products are highly appreciated in the Sudanese diet for their indispensable nutritional value, and they thus contribute significantly to the food and nutrition security of the population [10].

The study showed that 58.5% of the sampled population used to eat fish 2 to 3 times per month and about 69.4% purchased between 1 and <3kg each time.

The average fish consumption per individual was calculated as 0.4kg each time, with an average of 0.8kg per month, 9.6kg per year in the study area. However Sudan per capita fish consumption was estimated in 2008 as 1.6 kg per annum, which was considered low compared with other parts of the world [11]. Fisheries contribute marginally in the national economy of the Sudanese 2012 GDP value, though the exact value is not recorded as a result of the prevailing poor statistical data collection effort. However, a total fish export value of USD 0.2 million and a per capita fish consumption level of 1.8 kg were reported for 2009 [12].

The correlation between the average monthly income of the family and the rate of fish consumption was highly significant ($p \leq 0.00$). Similarly a highly significant correlation was found between the original residency of the family and the frequency of fish consumption ($p \leq 0.00$). This was an indication of the culture of the coastal population to take fish in their diet.

Although 66.7% of the population studied preferred to have fish food as fried, nevertheless, it was not the best way of food preparation particularly for those who were sensitive to fatty and greasy food. Moreover fried fish was more costly than the grilled or cocked ones. However, fish end-users in the Sudan utilize the catch in several ways. About 70 percent of the harvest is consumed fresh, while sundried products and wet salted products account for 25 percent and five percent of the utilization methods respectively^[13].

The results indicated that 33% of the sampled population will boycott buying fish with high prices and the same percentage (33%) adopted contrasting opinion. This indicated relatively limited influence of prices on the rate of fish consumption, but this may probably be due to the permanent gap between supply and demand in the fish market. Aman (2006)^[14] mentioned that the prices of marine fishes in the local market were high and unaffordable for many poor families; similarly Mansour (2014)^[15] confirmed the negative impact of high prices on fish consumption.

The Sudan's percentage fish self-sufficiency is low because of poor productivity, and as a result fish is imported to satisfy growing annual deficits. A thriving trans-border trade involving the import and export of fish and fish products exists between the Sudan and its African and Arab neighbouring countries.

In 2009, the import value of fish and fishery products into the Sudan stood in the order of USD 4.6 million. Thus, chilled fish is imported from Ethiopia while shrimps are brought in from United Arab Emirates, Saudi Arabia and Egypt. Canned sardines, mackerels and tuna are imported from different Asian and European countries^[13].

The results obtained showed that 71.7% of the studied population was used to bring their fish from fish market; however, 11.8% was used to catch their fish from the sea. This could reflect the role of fishery sector in availing fish in the state.

Establishment of central fish market, new fish restaurant at Abu Hashish coast and increase on tourism activities were behind flare up in fish prices in Port Sudan fish market. This was also mentioned by (Elawad and Mahmoud, 2014)^[16].

The study showed that about 12.1% of families have at least one of family member who does not eat fish, due to personal like and dislike, tradition, and culture, and sensitivity against fish food.

The study indicated that 62.1% of the population used to eat traditional processed fish food (Fasiekh, Maloha) and 61.5% used to have canned fish products. This is an indicator of expected success of establishing such enterprises in the Red Sea State. There were considerable amount of traditional fish food consumption in the Red Sea State; the average consumption of Maloha was calculated as 3500kg per month however, the consumption will greatly drop in summer season (Salih, personal communication). The main source of Maloha is Khartoum. Some efforts have been made through the UNIDO project "Recovery of coastal livelihood in the Red Sea State of Sudan through the modernization of artisanal fisheries and the creation of new market opportunities, market assessment and recommendations" to introduce such activity within the established women societies in the state, however, these societies were facing some problems in marketing, thus, they used to produce the products upon request and/ or in occasions.

Similarly there were considerable consumption of Faseikh in the Red Sea State, with an average consumption of about

1000 kg per month, (Al Gony, personal communication), however, all the products were imported from Khartoum and Al Dowaim.

Fishery related activities are not only essential in the household economy as sources of cash/incomes, but they also provide a source of nutritive food, nutritionally fish is therefore one extremely important direct source of protein and micronutrient for millions of people in Africa^[17, 18]. More than anywhere else, rural fishing communities rely largely on fish for the much-needed protein as it is known that the per capita fish consumption in such communities is significantly higher than the national average. Fisheries, therefore, play for those communities the multiple, indispensable role of being a major source of food and nutrition security, livelihood, and income generation. However, most rural areas of the Sudan have benefitted significantly from the fisheries activities which are conducted in their environs. Fishing and associated economic operations generate both employment and investment opportunities, thus curbing rural-urban population shift^[10].

4. Conclusions and Recommendations

Sudanese coastal fisheries resources were supposed to gain more attention, since the coastal area is located in semi-arid region, were other natural resources were so limited, however, lack of studies, research and consequently lack of reliable data concerning fish consumption, utilization, processing and marketing is one of the major constraints hinders fishery sector development planning, thus, establishing data base bank for fishery sector was highly recommended. There was a considerable demand for traditional processed fish products in the Red Sea State, with an average of about 42 tons per year for Maloha and 12tons per year for Fasiekh. This was regarded as a promising area to improve the contribution of fisheries sector in household fish security through establishing small manufacturing enterprises for processing, packing and marketing of such products from local fisheries resources.

5. Acknowledgements

The authors are grateful to Food & Agriculture Organization of the United Nations (FAO) for the financial support. The Acknowledgments are extended to the Red Sea University (RSU) & Marine Fisheries Administration (MFA) for their cooperation & support. Special thanks to the Institute of Marine Research (IMR), Red Sea University for hosting the task of the research project.

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