

The average per capita consumption of fish in Basrah Governorate, Iraq, from the period 2016-2018

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Abstract

This study analyzed per capita fish consumption in the Al-Basrah Governorate, Iraq from 2016-2018 to. The total amount of fish consumed was 137,121 tons, comprising 27.6% (37,901 tons) in 2016, 30.9% (42,357 tons) in 2017, and 41.5% (56,863 tons) in 2018. Freshwater fish accounted for 52.0% (71,362 tons) of consumption, while marine fish accounted for 44.9% (61,541 tons). Frozen fish accounted for 3.1% (4,219 tons). The per capita consumption rates were 8.8, 9.8, and 13.2 kg/year in 2016, 2017, and 2018, respectively. Consumption peaked in Al-Faw district at 36.6 kg/year in 2018 and was lowest in the Al-Basrah district at 6.5 kg/year in 2016. Overall, the per capita fish consumption increased across the Al-Basrah governorate from 2016 to 2018. This study provides important data regarding fish consumption patterns and trends in southern Iraq.

Keywords: Fish consumption, marine fishes, freshwater fishes, frozen fish, Basrah, Iraq

Introduction

Fish are an essential source of food needed to build the human body because they are one of the sources of animal protein necessary to maintain human health and safety, and are easier to digest, absorb, and assimilate compared to the protein found in red meat and poultry meat, in addition to containing fatty acids needed to protect humans from heart and circulatory diseases (Nasser, 2015). Fish and fish products play a crucial role in nutrition and global food security and are an essential source of micronutrients such as vitamins, minerals (zinc, iron, iodine, and selenium), and omega-3 fatty acids (FAO, 2019). Fish and fishery products have negligible impacts on the natural environment (FAO, 2020). Fish accounts for approximately 17 percent of human consumption of animal proteins, providing

nearly 20 percent of the average per capita intake of animal proteins for approximately 3.3 billion people and 10 percent for 5.4 billion people (FAO, 2019).

Global per capita apparent fish consumption has increased dramatically over the past few decades, reaching 20.3 kilograms in 2017. Preliminary data for 2018 and estimates for 2019 indicate additional growth of up to About 20.5 kilograms in 2019, and this expansion in demand was driven by a combination of population growth, rising incomes, urbanization, a significant expansion in fish production, and the development of more efficient distribution channels (FAO, 2020).

The average per capita fish consumption in Arab countries is approximately 12 kg/year. The average per capita share of fish in the Arab

countries varies, as it is about 269 kg per year in Mauritania and ranges between 30-68 kg in Morocco and Oman and between about 23.14 kg in Egypt, Yemen, Qatar, Bahrain, and Emirates, and between 1-11 kg in Syria, Sudan, Kuwait, Lebanon, Saudi Arabia, Somalia, Algeria, Libya, and Tunisia, and decreases to less than one kilogram per year in Jordan, Djibouti, and Iraq (Abdul-Ridha, 2007).

Nezami (2007) found that the per capita fish consumption in Iran is less than half as much as the world average, while the world annual average seafood consumption stands at around 16 kg, Iran's per capita diet of the product is estimated at around 7 kg/year. Adeli *et al.* (2011) found that consumption per capita in Tehran is 13.3 kg, divided into 6.4 kg for farmed fish, 5.8 kg for wild fish, and 1.1 kg for canned fish, respectively. Sagun and Sayg (2021) reported that despite the positive effects of aquatic products on human health, their consumption in Turkey has decreased over time and is currently lower than in most countries, with 6.3 kg per capita, which is why fish consumption in Turkey is less than in other countries, which is the greater preference for terrestrial production.

In Iraq, Al-Sukti *et al.* conducted a few studies on the per capita consumption of fish. (1974) reported that the Iraqi per capita fish consumption for 1973-1974 was 2.3 kg/year, depending on the figures contained in the annual statistics of the Ministry of Planning, in addition to the fishing results of vessels affiliated with the General Company for Fish. This percentage is expected to reach 3, 3.5, 4, 5, 5.5, and 9.5 kg/year in 1975, 1976, 1977, 1978, 1979, and 1985, respectively. The expected per capita consumption of fish in Basrah Governorate was 3 kg/year in 1975, with a consumption rate of 2841 tons, with a population of 947000 and 5.5 kg/year in 1979, with a consumption rate of 5967.5 tons and a population of 1087000 people (Al-Sukti *et al.*, 1974). The latest data in this field were based on the figures confirmed in the report of the federal board of supreme audit on the policy of the Ministry of Agriculture to develop fisheries from 2011 to 2017, which estimated the Iraqi

per capita share of fish between 0.9-2.4 kg/year, while the statistics of the Ministry of Planning, the Central Statistical Organization for the period from 1990-2002 indicated that the average per capita share of Iraq is 1.39 kg/year compared to the per capita share in 1980 of 3.4 kg/year (Federal board of supreme Audit, 2019). No percentage of the per capita share of fish for the period from 2015 to 2017 in Iraq was determined in the Food and Agriculture Organization of the United Nations report owing to the lack of data (FAO, 2020).

The current study aims to determine the Iraqi per capita share of fish for the first time in the Basrah Governorate for the years 2016, 2017, and 2018.

Material and Methods

Data on the amount of fish consumed in Basrah governorate for the years 2016, 2017, and 2018 were collected in cooperation with the Ministry of Agriculture, Office of Animal Resources, by making regular tours to the fish selling places (auction sites) for freshwater and marine fish in the districts of Basrah governorate represented in the districts of Basrah, Shatt Al-Arab, Al-Hartha, Al-Zubair, Al-Faw, Al-Qurna, Al-Midaina, Al-Dair and Abu Al-Khaseeb (Figure 1) and taking the data through records in which the quantities, types, and prices of fish are recorded in the fish selling places and the names of the traders as well as the data obtained from the frozen fish stocks and stores.

The latest statistics for the population of Basrah Governorate, according to 2016 estimates, were adopted from the province's official website. The population of Basrah Governorate reached 4,301,000, four million, and three hundred and one thousand people, according to the following distribution:

Al-Basrah District	1775000
Al-Qurna District	450000
Shatt Al-Arab District	200000
Al- Midaina District	240000
Al-Faw District	56000
Abu Al-Khaseeb District	230000
Al-Hartha District	154000
Al-Zubair District,	930000



Figure 1. A map showing the administrative divisions of Basrah Governorate

Results

The amount of fish consumed between January 2016 and December 2018 in the Basrah Governorate amounted to 137121 tons, including 37901 tons in 2016, 42357 tons in 2017, and 56863 tons in 2018, which is equivalent to 27.6, 30.9, and 41.5%, respectively, of the total amount of fish consumed. Freshwater fish accounted for (71362 tons) of fish consumed, which is equivalent to 52.0%. Its highest appearance was (27017 tons) in 2018, which accounted for

43.9%, while the amount of marine fish constituted (61541 tons), equivalent to 44.9%. The highest amount was in 2018, amounting to 27133 tons, at a rate of 44.1%, and the amount of frozen fish was (4219 tons), at a rate of 3.1% of the quantity consumed; the highest quantity consumed was in 2018, amounting to 2713 tons, or 4.4% (Figure 2).

The annual per capita consumption rates for the years 2016, 2017, and 2018 in the Basrah Governorate were 8.8, 9.8, and 13.2 kg/year, respectively.

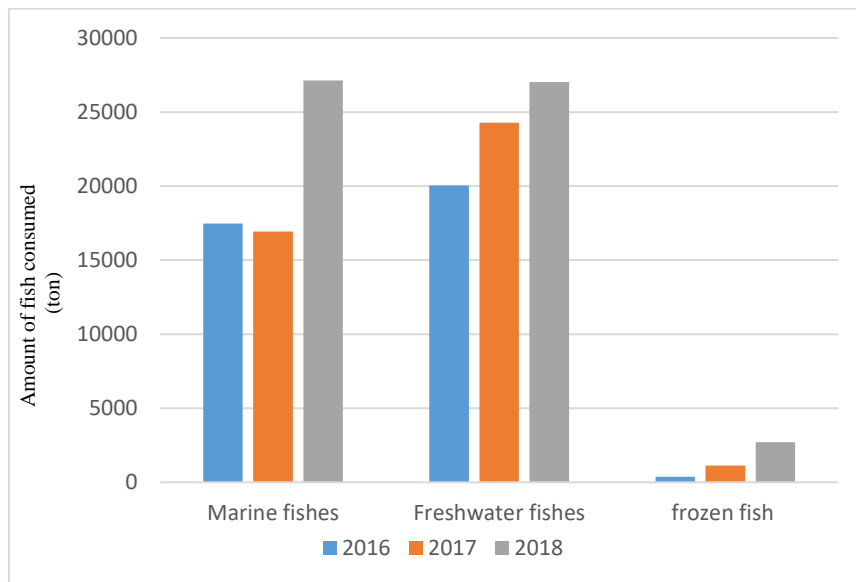


Figure 2. Quantities of freshwater, marine, and frozen fish consumed in Al-Basrah Governorate Al-Basrah District

The amount of fish consumed in the Basrah district amounted to 42046 tons during the study period, equivalent to 30.7% of the total amount consumed, including 11498 in 2016, 13509 in 2017, and 17039 tons in 2018. The per capita consumption rate for 2016 in the Basrah district was 6.5 kg/year, the highest monthly consumption rate was 0.59 in May, and the lowest was 0.47 kg/month in February, while the consumption rate in 2017 for fish was 7.6 kg/year and the highest rate was 0.75

kg/ month in July was 0.47 kg/month in October, while this percentage increased in 2018 to reach 9.6 kg/year. The highest monthly consumption rate was 0.97 kg/month in June, and the lowest was 0.52 kg/month in January (Figure -3). Marine fish constituted the highest amount consumed in 2016 and 2018, reaching 6470 and 9231 tons, equivalent to 56.3 and 54.2%, respectively, whereas freshwater fish formed the highest amount in 2017, amounting to 6802 tons, or 50.4% of the fish consumed.

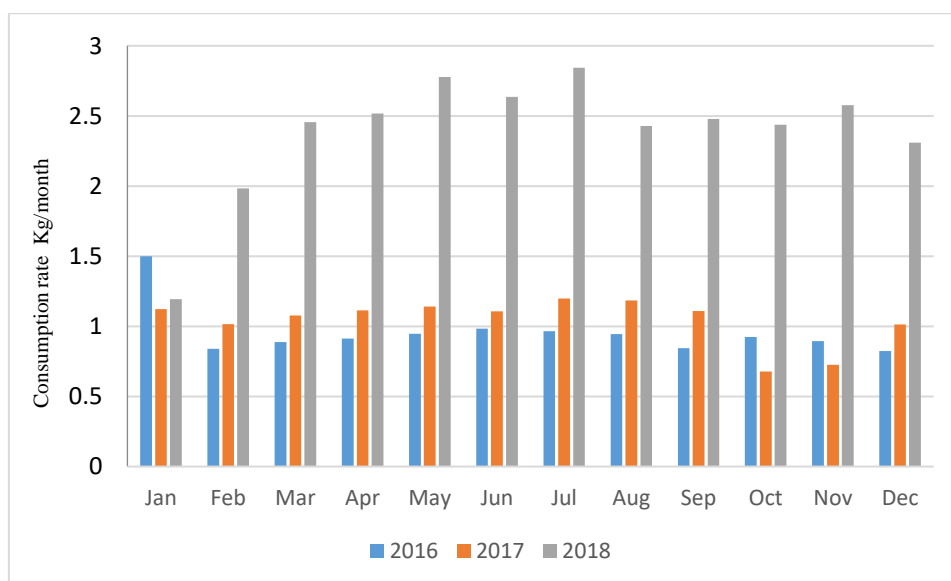


Figure 3. Monthly changes in per capita consumption of fish kg/month in Al-Basrah district for the years 2016, 2017 and 2018

Shatt Al- Arab District

The amount of fish consumed in the Shatt Al-Arab district reached 10517 tons during the study period, equivalent to 7.7% of the total amount consumed, including 2294 tons in 2016, 2496 in 2017, and 5727 tons in 2018. The highest annual consumption rate was obtained in 2018 and amounted to 29 kg/year, with a monthly consumption rate of the highest of 2.8 kg/month in May and July, and the lowest was 1.2 kg/month in January, reached in 2016 and 2017, respectively, 11 in 12.5 kg/year. The highest monthly consumption

rate in 2016 was obtained in January (1.5 kg/month) and below (0.8 kg/month) in February, September, and December, while the highest monthly consumption rate in 2017 was in July and amounted to (1.2 kg/month) and the lowest (0.7 kg/month) in October (Figure 4). Marine fish constituted the highest amount consumed throughout the study period, reaching 1297, 1341, and 3329 t, equivalent to 56.6, 53.7, and 58.1% in 2016, 2017, and 2018, respectively.

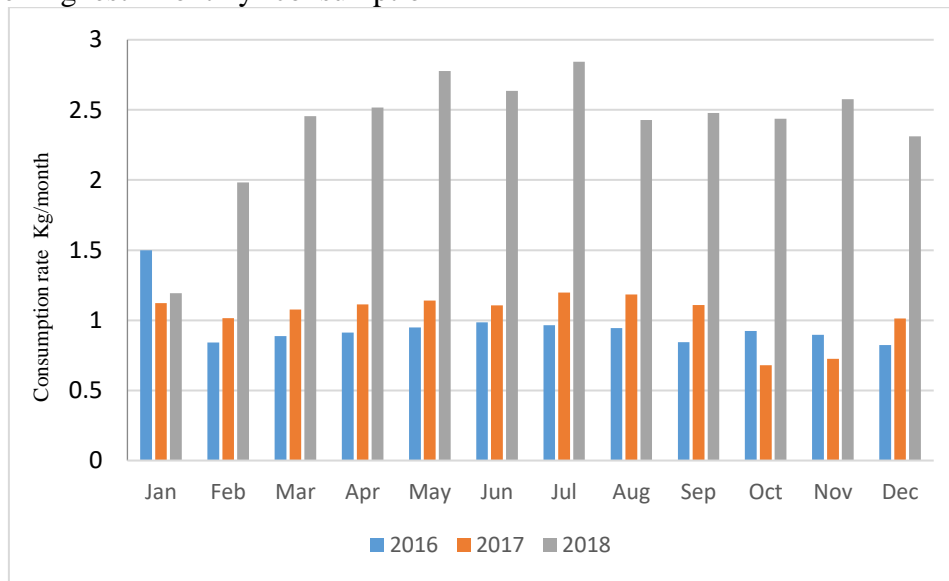


Figure 4. Monthly changes in per capita consumption of fish per month in Shatt Al-Arab district for 2016, 2017, and 2018.

Al-Hartha District

The amount of fish consumed in the Al-Hartha district reached 8001 tons during the study period, equivalent to 5.8% of the total amount consumed, including 2222 in 2016, 2702 in 2017, and 3077 tons in 2018. The average per capita consumption in 2016 in the Al-Hartha district was 14 kg/year. The monthly consumption rate was 1.5 kg/month in January 1.1 kg/month, in February, March, May, November, and December, while the consumption rate in 2017 was 18 kg/month,

with the highest rate being 1.8 kg/month in June and July. The lowest was 1.1 kg/month in October, whereas this consumption rate increased from 2018 to 20 kg/month. The highest monthly consumption rate was 2 kg/month and the lowest was 1.3 kg/month in February (Figure- 5). Freshwater fish constituted the highest amount throughout the study period, reaching 1499, 1897, and 1775 tons, equivalent to 67.5, 70.2, and 57.7% in 2016, 2017, and 2018, respectively.

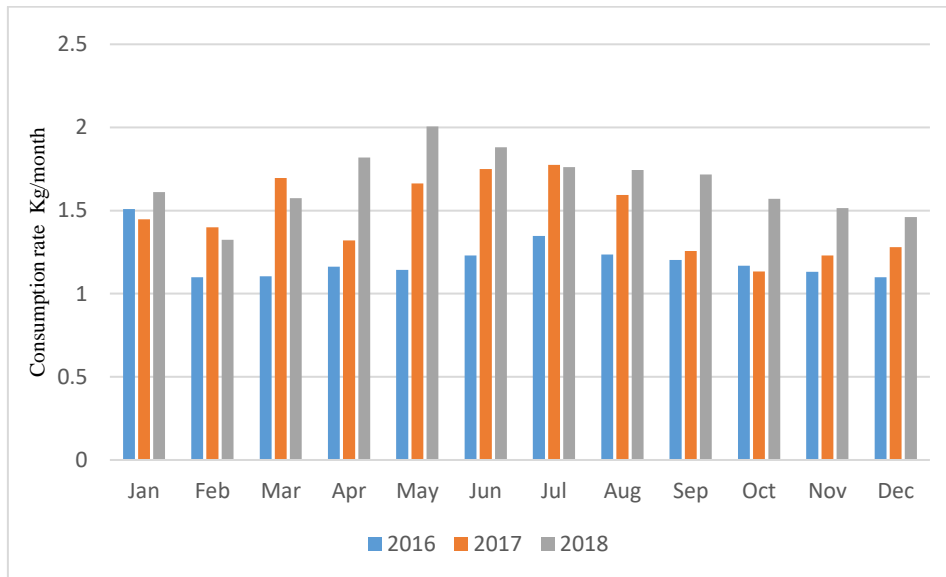


Figure 5. Monthly changes in per capita consumption of fish per month in Al-Hartha district for 2016, 2017, and 2018.

Al-Dair district

The amount of fish consumed in the Al-Dair district was 5053 tons during the study period, equivalent to 3.7% of the total quantity consumed, including 1436 tons in 2016, 1633 tons in 2017, and 1984 tons in 2018. The average per capita consumption for 2016 in the Al-Dair district was 11.04 kg/year, and the higher average monthly consumption was 1.22 in July, the lowest was 0.79 kg/month in October, the consumption rate in 2017 for fish was 12.6 kg/year, and the highest rate is 1.34

kg/month in June. The lowest was 0.63 kg/month in September, while this ratio reached 2018 to 20 kg/year, the highest monthly consumption rate was 1.44 kg/month in May and the lowest was 1.11 kg/month (Figure -6).

Freshwater fish constituted the highest amount consumed in the Al-Dair district throughout the study period, reaching 9664, 1143, and 1134 tons, equivalent to 67.3, 70.0, and 57.2% in 2016, 2017, and 2018, respectively.

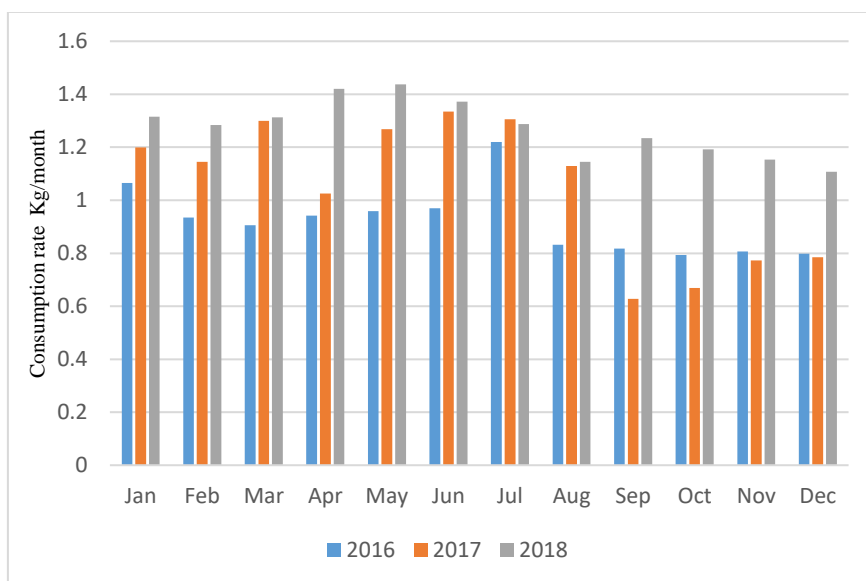


Figure 6. Monthly changes in per capita consumption of fish kg/month in the Al-Dair district Al-Zubair District

The amount of fish consumed in the Al-Zubair district was 23076 tons during the study period, equivalent to 16.83% of the total quantity consumed, including 6393 tons in 2016, 7543 in 2017, and 9140 tons in 2018. The highest annual consumption rate was obtained in 2018 it amounted to 9.8 kg/year, with a monthly consumption rate of 0.9 kg/month above 0.9 kg/month in May and 0.7 kg/month in January, while in 2016 and 2017, respectively, it reached 6.88 and 8.11 kg/year, the highest monthly consumption rate in September 2016 (0.63 kg/month) and the

lowest (0.49 kg/month) in February, while the highest monthly consumption rate in 2017 was in September (1.26 kg/month) and the lowest (0.39 kg/month) October (Figure-7). Freshwater fish constituted the highest amount of fish consumed in 2016 and 2017, reaching 3350 and 4066 tons, equivalent to 52.4 and 53.9%, respectively. The relative proportions of marine and freshwater fish consumption were recorded in 2018, when the amount of marine fish was 4214 tons, at a rate of 46.1%. Freshwater fish accounted for 4335 tons, representing 47.4%.

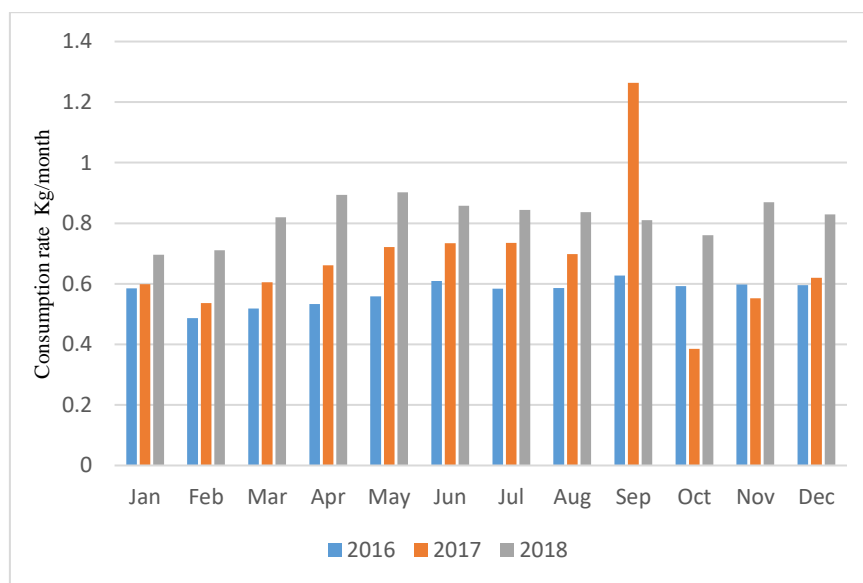


Figure 7. Monthly changes in per capita consumption of fish, kg/month, in the Al-Zubair district

Al- Qurna District

The fish consumed in the Al-Qurna district reached 16,073 tons during the study period, equivalent to 11.7% of the total quantity consumed, including 4652 in 2016, 4,690 tons in 2017, and 6,731 tons in 2018. The average per capita consumption in 2016 in the Al-Qurna district was 10.3 kg/year, and the highest monthly consumption rate was 0.95 kg/month in April. The lowest was 0.35 kg/month in January, while the consumption rate for fish was 10.4 kg/year in 2017, and the highest was

1.33 kg/month. The lowest was 0.44 kg/month in October, whereas the highest rate was recorded for consumption in 2018, which amounted to 14.9 kg/year. The highest monthly consumption rate was 1.37 kg/month in May, and the lowest was 1.08 kg/month in February (Figure -8).

Freshwater fish constituted the highest amount consumed throughout the study period, reaching 3142, 3310, and 3898 tons, equivalent to 67.5, 70.6, and 57.9% in 2016, 2017, and 2018, respectively.

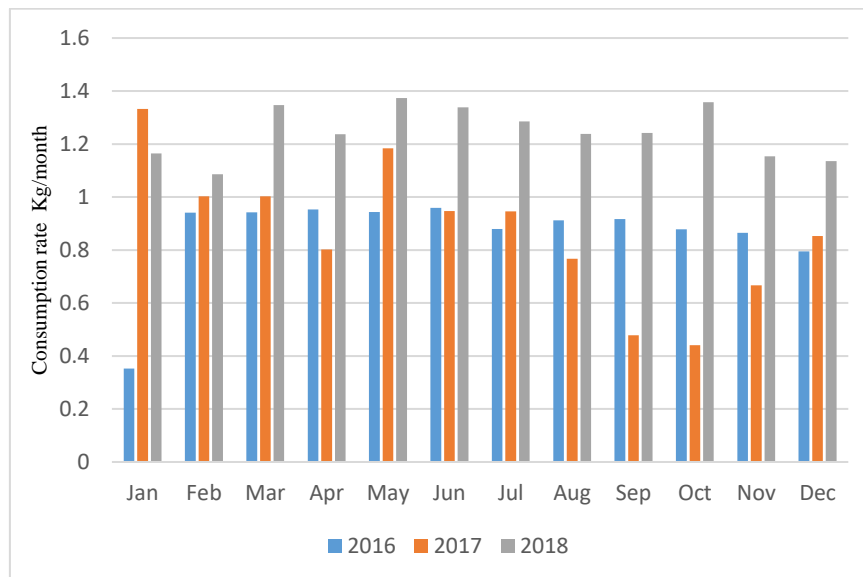


Figure 8. Monthly changes in per capita consumption of fish per month in the Al-Qurna district.

Al-Midaina district

The amount of fish consumed in the Al-Midaina district amounted to 16,668 tons during the study period, equivalent to 12.2% of the total quantity consumed, including 5179 in 2016, 4956 in 2017, and 6533 tons in 2018. The average per capita consumption in 2016 in the Al-Midaina district was 21.6 kg/year, the highest monthly consumption rate was 1.99 in January, and the lowest was 1.61 kg/month in December, while the consumption rate in 2017

for fish was 20.7 kg/year and the highest rate was 2.1 kg/month in August. The lowest was 1.17 kg/month in October 2018, which increased to 27.2 kg/year. The highest monthly consumption rate was 2.61 kg/month, and the lowest was 1.91 kg/month in February (Figure-9). Freshwater fish also constituted the highest amount consumed throughout the study period, reaching 3494, 3497, and 3683 tons, equivalent to 67.5, 70.6, and 56.4% in 2016, 2017, and 2018, respectively.

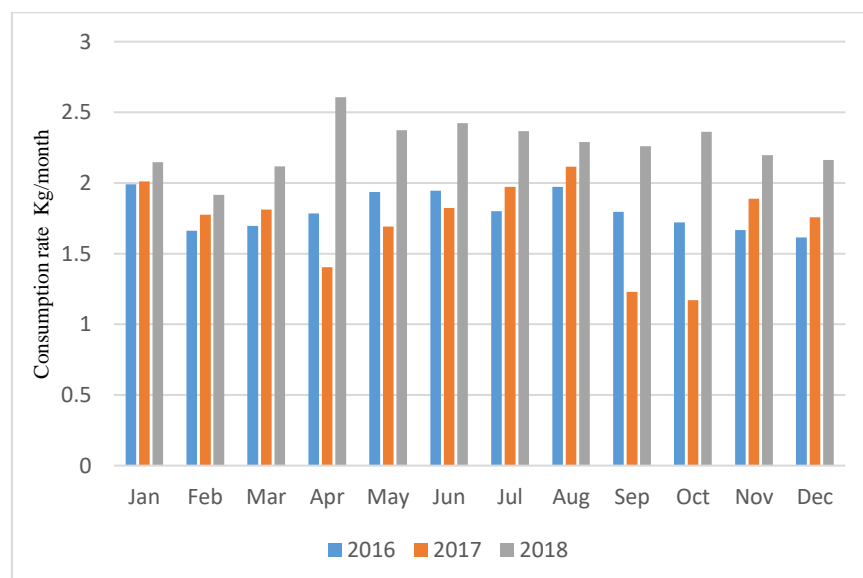


Figure 9. Monthly changes in per capita consumption of fish kg/month in the Al-Midaina district

Al-Faw District

The amount of fish consumed in the Al-Faw district amounted to 4577 tons during the study period, equivalent to 3.33% of the total amount consumed, including 1187 in 2016, 1343 in 2017, and 2047 tons in 2018. The highest annual consumption rate was obtained in 2018, amounted to 36.6 kg/year, with a monthly consumption rate of 3.9 kg/month above in May. Below 1.8 kg/month in January, whereas in 2016 and 2017, it reached the highest monthly consumption rate of 21.2 and 24.9

kg/year. In 2016, it was obtained in May (2.1 kg/month) and the lowest (1.5 kg/month) in February, while the highest monthly consumption rate was in August 2017 and amounted to (2.96 kg/month) and lowest (1.4 kg/month) in October (Figure 10). Marine fish constituted the highest amount consumed throughout the study period in the Al-Faw district, reaching 1067, 8143, and 6846 tons, equivalent to 52.1, 60.7, and 57.7% in 2016, 2017, and 2018, respectively.

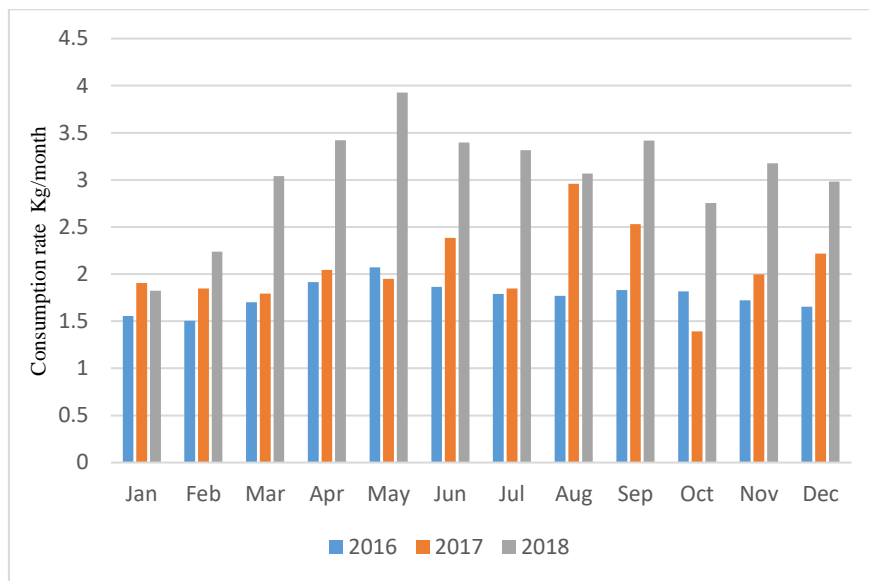


Figure 10. Monthly changes in per capita consumption of fish in the Al-Faw district for 2016, 2017, and 2018.

Abu -Al Khaseeb District

The amount of fish consumed in the Abu Al-Khaseeb district amounted to 11111 tons during the study period, equivalent to 8.1% of the total amount consumed, including 3040 tons in 2016, 3486 tons in 2017, and 4585 tons in 2018. The highest annual consumption rate was obtained in 2018 and reached 19.9 kg/year, with a monthly consumption rate of 1.96 kg/month in May, and the lowest of 1.04 kg/month in January. In 2016 and 2017, it reached, respectively, 13.2 and 15.2 kg/year. The highest monthly consumption rate was

observed in May 2016 (1.27 kg/month) and the lowest (1.0 kg/month) in December, while the highest monthly consumption rate was observed in August 2017. It reached (1.53 kg/month). The lowest (0.84 kg/month) was observed in October (Figure 11). Freshwater fish constituted the highest amount consumed in 2017, reaching 1959 tons, equivalent to 56.2%, whereas the highest amount of marine fish consumption was recorded in 2016 and 2018, reaching 1755 and 2341 tons, at a rate of 57.7% and 51.1%, respectively.

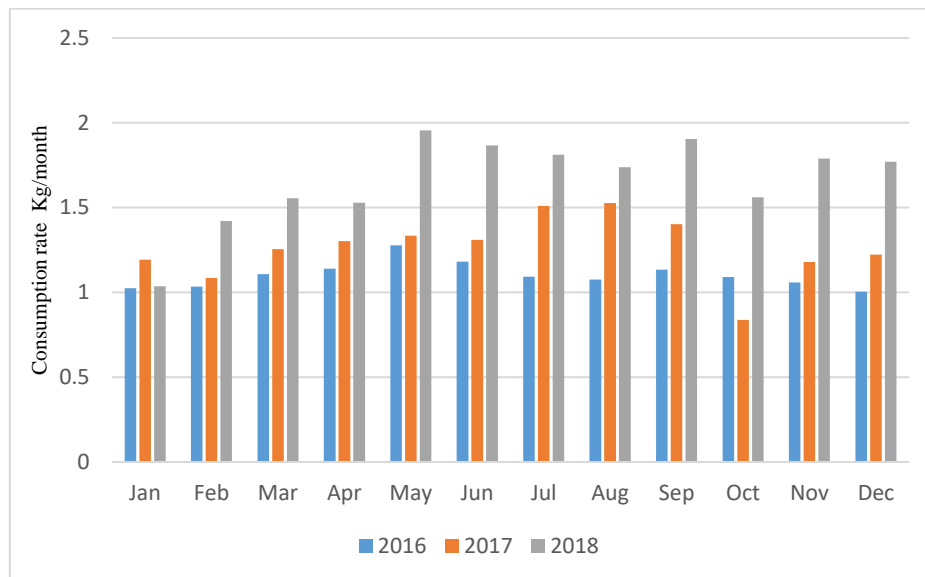


Figure11. Monthly changes in per capita consumption of fish kg/month in the Abu Al-Khaseeb district

Discussion

Eating fish is part of the cultural traditions of many people. Fish are a major source of food and essential nutrients in some populations. Consumption of fish provides energy, protein, and a range of other important nutrients, including the long-chain n-3 polyunsaturated fatty acids (LCn3PUFAs), among the general adult population, consumption of fish, particularly fatty fish, lowers the risk of mortality from coronary heart disease (FAO, 2011)

The results of the current study showed that the amount of fish consumed for the period from January 2016 to December 2018 in Basrah Governorate amounted to 137,121 tons, and the annual per capita consumption rate for the years 2016, 2017, and 2018 in Basrah Governorate amounted to 8.8, 9.8 and 13.2 kg/year, respectively. These results are less than what was recorded in Arab countries, where a study prepared by the Ministry of Economy in the United Arab Emirates revealed that the annual per capita consumption of fish reached 33 kg/year, making it the highest rate in the Gulf Cooperation Council countries compared to the consumption of Omani per capita 27.2 kg/year and Qatar 14.2 kg/year. In comparison, the Kingdom of Bahrain maintained the same rate of 16.7 kg/year, reaching 10.75 kg/year in Saudi Arabia (Abdul Hamid,2014).These percentages are considered low compared to

those of Iceland (90.1 kg), Japan (62 kg), Malaysia (56 kg), and China (50 kg per person per year) (Al-Sahli, 2020). The decrease in the consumption of frozen fish compared to its marine and freshwater counterparts is due to the dietary habits of Basrah Governorate residents, who tend to consume fresh fish despite their low prices compared to other types.

The results of the per capita consumption rate in the Al-Basrah governorate showed a remarkable difference according to the districts affiliated with the governorate, where the highest values were recorded in the Al-Faw district, reaching 36.6 kg/year in 2018, and the lowest at 6.5 kg/year in the Al-Basrah district in 2016. This may be due to a change in consumption patterns caused by varying individual income levels. Cultural and dietary patterns from one district to another, and this is reflected in the results of the current study, where the high rate of consumption of river fish is noted in the districts North of Basrah: Al-Hartha (67.5, 70.2, 57.7%), Al-Dair (67.3, 70.0, 57.2%), Al-Qurna (67.5, 70.6, 57.9%) and Al-Midaina (67.5, 709.6, 56.4%) of the fish consumed for the years 2016, 2017 and 2018, respectively, while marine fish constituted the highest percentage of fish consumed in the Al-Faw and Shatt Al-Arab districts, reaching (52.1, 60.7 and 57.7%) and (56.6, 53.7 and 58.1%) respectively.

The results of the current study showed an increase in the rate of fish consumption in all parts of the Basrah Governorate in 2018 compared to its counterparts in 2016 and 2017, where the rate of increase in the rate of fish consumption in the districts of Basrah, Shatt Al-Arab, Al-Hartha, Al-Dair, Al-Zubair, Al-Qurna, Al-Midaina, Al-Faw, and Abu Al-Khaseeb reached 19.2, 45, 8.6, 29 and 17.6, 18.2, 11.4, 26.6, and 20%, respectively, due to the significant increase in the population of the Al-Basrah Governorate as a result of massive immigration from neighboring governorates for various reasons, including clan conflicts and operations to drain the marshes, foremost of which is Maysan governorate, being one of the largest governorates expelled due to It has lost the necessities of life since the fifties of the last century due to the living conditions, security and others, and more than four million citizens of its children have abandoned it to other Iraqi governorates and other countries (Al-Saadi, 2022). The Shatt al-Arab District showed the most significant increase in the rate of fish consumption in 2018 compared to other districts, which was due to the significant increase in the number of residents and their settlement in the area because of selling agricultural lands and converting them into new housing units (Al-Tamimi, 2015).

The results of the current study showed monthly differences in the percentage of per capita fish consumption in the districts of the Basrah Governorate, and the highest rate was in the months of moderate temperatures and summer. This is probably due to the increase in the quantity of marine fish offered, which coincided with the increase in the catch from March to December, and many studies have confirmed this (Mohamed, 1993; Ali *et al.*, 1998; Mohamed *et al.* 2005 and Al-Shamary, 2020). In addition to increasing the supply of freshwater fish, mainly the common carp *Cyprinus carpio*, the harvest season for this species begins in October, which is the right time to eat fish (Mosully, 2016).

Conclusions

The current study showed that the average Iraqi per capita fish consumption in the Basrah Governorate is much higher than the values recorded in reports and studies; however, they

are few; in comparison, it is considered less than that recorded in other countries.

Acknowledgement

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معدل استهلاك الفرد من الأسماك في محافظة البصرة بالعراق من الفترة 2016-2018

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2-وزارة الصحة/قسم صحة البصرة
4-وزارة الزراعة/قسم الثروة الحيوانية

1-مركز علوم البحار/جامعة البصرة
3-كلية علوم البحار/جامعة البصرة

المستخلص:

تناولت الدراسة الحالية احتساب نصيب الفرد من استهلاك الأسماك في محافظة البصرة ، حيث بلغت كمية الأسماك المستهلكة للفترة من كانون الثاني 2016 إلى كانون الأول 2018 في محافظة البصرة 137،121 طن ، منها 37،901 طن عام 2016 ، 42،357. طناً عام 2017 و 56863 طناً عام 2018 أي ما يعادل 27.6 و 30.9 و 41.5٪ على التوالي من إجمالي كمية الأسماك المستهلكة ، شكلت أسماك المياه العذبة المستهلكة (71362 طناً) أي ما يعادل 52.0٪ ، في حين بلغت الكمية المستهلكة من الأسماك البحرية. شكلت الأسماك (61541 طن) أي ما يعادل 44.9٪. بلغت كمية الأسماك المجمدة (4219 طن) بنسبة 3.1٪ من الكمية المستهلكة. بلغت معدلات استهلاك الفرد السنوي للأعوام 2016 و 2017 و 2018 في محافظة البصرة 8.8 و 9.8 و 13.2 كجم / سنة على التوالي. تم تسجيل أعلى معدل استهلاك للأسماك في منطقة الفاو حيث بلغ 36.6 كجم / سنة في عام 2018 وأقل من 6.5 كجم / سنة في محافظة البصرة عام 2016. وأظهرت الدراسة الحالية زيادة معدلات استهلاك الأسماك في جميع أنحاء منطقة Al-Faw. في محافظة البصرة في عام 2018 مقارنة بمثيلاتها في عامي 2016 و 2017.

الكلمات المفتاحية: استهلاك الأسماك، الأسماك البحرية، أسماك المياه العذبة، الأسماك المجمدة، البصرة، العراق