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Fish Consumption in Hadramawt

Insights from Household Survey Data

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Key Findings

A new representative consumption survey of 1,600 households in Hadramawt Governorate, Yemen, reveals the following key findings:

- Fish is the primary animal-source food in Hadramawt, as 96% of households report consuming it in the past seven days, compared with 58% that report consuming poultry and 6% that report consuming meat in this period.
- Inland households consume 13 kg of fish per capita per year, while coastal households consume 29 kg per capita per year, which is 40% more than the global average of 20.7 kg per capita.
- Fish consumption is four times higher than meat consumption overall, and more than 10 times higher than meat consumption in coastal areas.
- Inland households predominantly consume large and small tuna species, whereas coastal households rely on small tuna and lower-value species such as small pelagic fish.
- Fresh fish is the most affordable animal-source food in coastal and inland areas. However, prices for kawakawa, the most consumed fresh fish, are two times higher inland than on the coast.
- 61% and 43% of inland households report consuming processed (i.e., salted, dried, smoked) and canned fish, respectively, while households in coastal areas predominantly consume fresh fish only. Only 2% of fish is purchased frozen.

With its vast coastline, Yemen has the potential to provide significant quantities of fish, a nutrient-dense food, for its people. However, recent data on how much fish is consumed in Yemen, and Hadramawt as the main fishing governorate, is sparse.

Namely, relying on consumption data from Yemen's 2005–2006 Household Budget Survey, Ecker et al. (2010) estimated that average fish consumption per capita in Hadramawt was 17.8 kg/year. More recently, a study by Dey et al. (2026) showed that 43% of respondents in Hadramawt, and more than 60% in some inland districts, had consumed fish within the past 24 hours, which was more frequent than consumption of other animal-source foods. Both studies underscored the importance of fish as one of the main protein sources across Hadramawt. However, a scoping review by Belton et al. (2026) identified

significant research gaps in terms of quantity, frequency, geographical distribution, and the species and product forms eaten. Thus, a survey of a statistically representative sample of the population was needed to better understand fish consumption patterns in this governorate.

We surveyed 1,600 households in Hadramawt, across 40 locations in four distinct geographic areas (10 locations per area): inland rural, inland urban, coastal rural, and coastal urban. This approach ensured inclusion of households with different socioeconomic status and livelihoods, as well as different access to markets and fisheries. We used a quasi-random sampling approach[1] to identify 40 eligible households in each of the 40 selected locations. Interviews were conducted in October 2025 during the fishing season. The survey collected information on household demographic characteristics and consumption of fish and other animal-source foods, including the type, species, quantity, frequency, price, and source of food products during the seven days preceding the data collection.

In this project note, we examine the main consumption patterns for fish, meat, and poultry across Hadramawt. We also estimate the associations between per capita fish consumption and expenditure and household characteristics, including households' geographic location.

Fish was the most consumed animal-source food group

Fresh fish is the most commonly consumed animal-source food in Hadramawt, both in terms of frequency and quantity (Table 1). More than 96% of households in our sample reported eating fresh fish, with households in coastal areas consuming statistically significantly more fresh fish on average than households in inland areas.[2] Fresh fish consumption in Hadramawt is substantial, ranging between 9 kg per capita per year in inland areas and 28 kg per capita per year in coastal areas of the governorate. On average, households in rural areas consume about 3 kg more fresh fish per capita annually than households in urban areas. Thus, differences in fresh fish consumption are primarily driven by geographic location (i.e., coastal vs. inland) rather than degree of urbanization (i.e., urban vs. rural).

A large share of inland households consume fish in other forms as well, such as processed (salted, dried, or smoked; 61% of households) and canned (43% of households). These rates are considerably lower in coastal areas (14% for processed and 9% for canned fish), as these households mainly rely on fresh fish for household consumption (97% of households). The quantity consumed of processed and canned fish in inland areas per capita is around 3 kg/year and 1 kg/year, respectively, which is substantially higher than in coastal areas. In total (fresh, processed, and canned), households in inland areas consume 13 kg of fish per capita per year, while coastal households consume 29 kg/year, which is 40% more than the global average of 20.7 kg per capita per year (FAO, 2024).

Meat and poultry[3] are consumed more in inland areas than in coastal areas, where a considerably higher proportion of households consume poultry than meat. More specifically, around 85% of households in inland areas consume poultry and around 31% in coastal areas. In terms of quantities, inland households consume about 7 kg per capita per year, which is almost 4 kg more than coastal households. Meat

[1] Quasi-random sampling implied determining the random starting number and sampling interval for each village, before field deployment. Enumerators' starting point in each village was a central landmark or well-known reference location. From that point, enumerators were instructed to proceed to the household corresponding to the predetermined random starting number. Subsequent households were selected by visiting every n^{th} household based on the predetermined sampling interval.

[2] Based on a t-test for difference in mean per capita consumption in coastal versus inland areas.

[3] Meat is defined as sheep, goat, beef, camel, and wild game, while poultry refers exclusively to chicken.

consumption ranges between 1% in coastal areas and 12% in inland areas. The highest consumption of meat is recorded in inland areas, at around 1 kg per capita per year.

Table 1. Annualized consumption of fish and meat (kg per capita per year)

	Coastal	Inland	Urban	Rural	Total sample
Fresh fish	27.9 (97%)	9.2 (94%)	16.9 (96%)	20.3 (95%)	18.7 (96%)
Salted/dried/smoked fish	1.2 (14%)	2.6 (61%)	1.4 (33%)	2.3 (42%)	1.9 (38%)
Canned fish	0.2 (9%)	1.1 (43%)	0.6 (22%)	0.6 (30%)	0.6 (26%)
Total fish	**29.4 (99%)**	**12.9 (98%)**	**19.0 (98%)**	**23.3 (99%)**	**21.2 (98%)**
Meat	0.1(1%)	1.2 (12%)	0.4 (6%)	0.8 (7%)	0.6 (6%)
Poultry	2.5 (31%)	6.8 (85%)	5.4 (66%)	3.9 (50%)	4.6 (58%)
Total meat and poultry	**2.5 (32%)**	**8.0 (87%)**	**5.9 (68%)**	**4.7 (51%)**	**5.3 (59%)**

Note: Showing unconditional mean, with and percent of households that reported consuming each food group in the past seven days in parentheses. Annualized per capita consumption is derived from consumption during seven-day recall period.

Compared to other animal-source foods, fish is consumed more regularly: at least four days per week in coastal areas of Hadramawt and around three days per week in inland areas. Across all areas of Hadramawt, poultry is consumed once a week and meat is consumed less than once per week, on average.

Proximity to coast influences diversity and price of fish consumed

Table 2 shows annualized per capita consumption of different fish species across Hadramawt. Overall, coastal communities consume more fresh fish than inland households, not only in terms of frequency and quantity (as already shown in Table 1), but also in terms of diversity.

Households in inland areas predominantly consume fish from the large tuna group, and coastal households rely more on lower-value fish species, such as small tuna and small pelagic fish. Similarly, households from urban areas consume more large tuna and less small tuna and small pelagic species, on average, compared with rural households.

Kawakawa, fresh sardines, yellowfin tuna, and longtail tuna are the most consumed species across coastal and inland areas. Kawakawa stands out for the high level of consumption, at about 12 kg per capita per year in coastal Hadramawt, though on average, per capita consumption of this species is about 5 kg/year lower in rural areas than in urban areas.

Around 19% of households consume fresh sardines and yellowfin tuna. However, per capita consumption of fresh sardines is more than 6 kg/year in coastal Hadramawt, compared with less than 2 kg/year for yellowfin tuna. Both yellowfin tuna and fresh sardines are notable for their contribution to household diets in inland Hadramawt; these are the most consumed species for inland households at about 2 kg per capita per year.

Species such as swordfish, yellowtail scad, chub mackerel, barracuda, emperor, grouper, thicklip grunt, and rabbitfish are consumed only in coastal areas, reflecting local availability and possibly low demand for these fish further inland.

Table 2. Annualized consumption of fish by species (kg per capita per year)

	Coastal	Inland	Urban	Rural	Total sample
Large tuna					
Longtail tuna	0.986 (7.8%)	1.910 (33.5%)	2.011 (26.3%)	0.885 (15.0%)	1.448 (20.6%)
Yellowfin tuna	1.662 (15.0%)	2.631 (39.4%)	2.589 (30.0%)	1.704 (24.4%)	2.146 (27.2%)
Skipjack	0.011 (0.1%)	0.016 (0.3%)	0.016 (0.3%)	0.011 (0.1%)	0.013 (0.2%)
Small tuna					
Kawakawa	12.428 (56.4%)	1.898 (25.4%)	4.649 (34.6%)	9.677 (47.1%)	7.163 (40.9%)
Striped bonito	0.470 (3.0%)	0.099 (1.9%)	0.444 (3.8%)	0.124 (1.1%)	0.284 (2.4%)
Frigate tuna	0.237 (1.8%)	0.005 (0.1%)	0.164 (1.0%)	0.078 (0.9%)	0.121 (0.9%)
Large pelagic					
Kingfish	0 (0%)	0.015 (0.3%)	0.002 (0.1%)	0.012 (0.1%)	0.007 (0.1%)
Swordfish	0.066 (0.6%)	0 (0%)	0.036 (0.4%)	0.030 (0.3%)	0.033 (0.3%)
Cobia	0.013 (0.1%)	0.007 (0.1%)	0.020 (0.3%)	0 (0%)	0.010 (0.1%)
Dorado / mahi-mahi	0.014 (0.1%)	0.019 (0.4%)	0.034 (0.5%)	0 (0%)	0.017 (0.3%)
Small pelagic					
Indian mackerel	0.392 (2.6%)	0.052 (1.1%)	0.322 (2.8%)	0.121 (1.0%)	0.222 (1.9%)
Sardine	6.471 (34.1%)	2.220 (20.9%)	3.745 (22.1%)	4.946 (32.9%)	4.345 (27.5%)
Yellowtail scad	0.015 (0.3%)	0 (0%)	0.015 (0.1%)	0 (0%)	0.008 (0.1%)
Chub mackerel	0.883 (4.8%)	0 (0%)	0.524 (2.8%)	0.359 (2.0%)	0.442 (2.4%)
Mackerel	0.717 (4.4%)	0.052 (0.6%)	0.501 (2.8%)	0.267 (2.3%)	0.384 (2.5%)
Trevally					
Trevally	1.674 (10.5%)	0.237 (4.6%)	0.710 (6.4%)	1.201 (8.8%)	0.956 (7.6%)
Blacktip trevally	0.052 (0.6%)	0.036 (0.6%)	0.086 (1.1%)	0.003 (0.1%)	0.044 (0.6%)
Bigeye trevally	0.401 (2.5%)	0.007 (0.1%)	0.233 (1.5%)	0.174 (1.1%)	0.204 (1.3%)
Other					
Barracuda	0.267 (2.0%)	0 (0%)	0.096 (0.9%)	0.171 (1.1%)	0.133 (1.0%)
Emperor	0.683 (4.1%)	0 (0%)	0.423 (2.3%)	0.260 (1.9%)	0.342 (2.1%)
Grouper	0.051 (0.1%)	0 (0%)	0.051 (0.1%)	0 (0%)	0.025 (0.1%)
Shark	0.246 (2.6%)	0.016 (0.1%)	0.072 (0.9%)	0.190 (1.9%)	0.131 (1.4%)
Seabream	0.088 (0.5%)	0.012 (0.1%)	0.088 (0.5%)	0.012 (0.1%)	0.050 (0.3%)
Thicklip grunt	0.080 (0.9%)	0 (0%)	0.034 (0.4%)	0.046 (0.5%)	0.040 (0.4%)
Rabbitfish	0.009 (0.1%)	0 (0%)	0 (0%)	0.009 (0.1%)	0.005 (0.1%)

Note: Showing unconditional mean, with % of households that reported consuming each fish species in the past seven days in parentheses. Annualized per capita consumption is derived from consumption during seven-day recall period. Red highlight = low, green highlight = high.

Table 3 shows average prices for fish, meat, and poultry in coastal and inland areas. The absence of price data for certain fresh fish species suggests that, although fish is consumed as shown in Table 2, it is either obtained through own catch or received for free.

Coastal areas benefit from lower prices for fresh fish. That is, distance from the coast increases prices. For example, the average price of kawakawa is 2,427 YER/kg in coastal areas compared to 4,717 YER/kg in inland areas. Yellowfin tuna is among the most expensive species, with an average price of 7,999 YER/kg. Fresh sardines are the most affordable species across the sample at 1,878 YER/kg, reflecting their role as a lower-cost protein source across Hadramawt. The only species that are more affordable than fresh sardines in inland areas are mackerel and seabream, but prices for these species are based on a relatively small number of observations.

Overall, fresh fish is one of the most affordable sources of animal protein and micronutrients for households throughout Hadramawt. Prices for processed and canned fish are higher than prices for most fresh fish species in both coastal and inland areas. Meat is considerably more expensive than fresh fish, with an average price of 15,917 YER/kg. Poultry is more expensive on average than fresh fish in coastal areas, while its average inland price is comparable to that of fresh fish. However, higher frequency of fresh fish consumption (at least three days per week) compared to poultry (around one day per week) in inland communities shows that households are likely to prefer fresh fish over poultry.

Table 3. Price of fish, meat, and poultry in coastal and inland areas (YER/kg)

	Coastal	Inland	Total
Large tuna			
Longtail tuna	3,817 (54)	5,917 (267)	5,564 (321)
Yellowfin tuna	6,715 (88)	8,359 (314)	7,999 (402)
Skipjack	4,000 (1)	5,000 (2)	4,667 (3)
Small tuna			
Kawakawa	2,427 (395)	4,717 (202)	3,202 (597)
Striped bonito	2,985 (20)	4,522 (15)	3,644 (35)
Frigate tuna	1,875 (10)	4,000 (1)	2,068 (11)
Large pelagic			
Kingfish	–	10,000 (1)	10,000 (1)
Swordfish	4,667 (2)	–	4,667 (2)
Cobia	–	3,000 (1)	3,000 (1)
Dorado / mahi-mahi	–	4,000 (3)	4,000 (3)
Small pelagic			
Indian mackerel	2,688 (12)	3,278 (9)	2,940 (21)
Sardine	1,571 (215)	2,279 (165)	1,878 (380)
Yellowtail scad	–	–	–
Chub mackerel	2,254 (28)	–	2,254 (28)
Mackerel	2,189 (25)	1,467 (5)	2,068 (30)
Trevally			
Trevally	2,484 (49)	7,329 (36)	4,536 (85)
Blacktip trevally	5,917 (4)	7,200 (5)	6,630 (9)
Bigeye trevally	6,400 (5)	3,500 (1)	5,917 (6)
Other			
Barracuda	2,196 (10)	–	2,196 (10)
Emperor	3,217 (16)	–	3,217 (16)
Grouper	–	–	–
Shark	5,208 (12)	8,000 (1)	5,423 (13)
Seabream	4,083 (4)	2,500 (1)	3,767 (5)
Thicklip grunt	3,500 (2)	–	3,500 (2)
Rabbitfish	–	–	–
Salted/dried/smoked fish	4,137 (113)	7,830 (489)	7,137 (602)
Canned fish	11,158 (74)	9,702 (344)	9,960 (418)
Meat	22,333 (3)	15,567 (55)	15,917 (58)
Poultry	4,588 (242)	4,523 (673)	4,540 (915)

Note: Reporting mean, with number of observations in parentheses. All prices are in YER from October 2025. At the time of data collection, 1 USD = 1,600 YER. Red highlight = low, green highlight = high.

Tables 2 and 3 demonstrate clear market separation between coastal and inland areas. Inland prices are almost always higher than coastal prices for the same species. However, this price difference is greater for small and large tuna than for small pelagic species. This indicates that there are greater economic incentives for actors in the supply chains to bring higher-value fish to inland markets than for lower-value fish.

In coastal areas, around 90% of fresh fish is purchased directly from landing sites and wet markets. In inland areas, however, only 20% of fresh fish is purchased from wet markets, while 80% is purchased from mobile vendors and local shops. Around 55% of fresh fish is stored on ice at the time of purchase in inland zones, compared with 19% near the coast. Less than 2% of fish is purchased frozen. Thus, higher inland prices for fresh fish not only reflect transportation costs and limited availability but also costs for the use of ice to maintain freshness as well as the profits of various actors in the supply chains.

Determinants of fish consumption

We use regression analysis to determine associations between household characteristics and (i) fish (fresh, processed, and canned) consumption as a share of annualized per capita consumption of animal-source foods (fish, meat, and poultry) and (ii) expenditure on fish as a share of annualized per capita expenditure on animal-source foods.

Table 4 shows that, for households in coastal areas, fish constitutes a significantly higher share of their consumption of animal-source foods on average (by 28 percentage points) compared with inland households. Similarly, living in coastal areas increases households' annual per capita fish expenditure share by 14 percentage points relative to inland households, despite lower fish prices in coastal areas (Table 3). The higher fish expenditure share is driven not only by significantly higher consumption of fish in coastal areas but also by lower consumption of meat, which is considerably more expensive than fish and so raises total expenditure in inland areas where it is consumed more.

Engagement of any household member in the fisheries sector is associated with lower average fish expenditure as a share of total expenditure on animal-source foods (by 20 percentage points), suggesting that a number of these households are able to obtain fish through their own catch. Generating income from livestock (i.e., being involved in the livestock sector) is correlated with lower annual per capita consumption of fish as a share of consumption of animal-source foods (by 4 percentage points), suggesting that households that rear livestock may be less reliant on fish than on other nutritionally dense animal-source foods.

Market access and conditions emerge as significant determinants of fresh fish consumption and expenditure. Namely, longer travel times to the nearest markets selling fresh fish are correlated with higher fish consumption as a share of consumption of animal-source foods. This could be driven by higher quantities consumed of canned and processed fish and also smaller quantities consumed of meat and poultry. Longer travel times also raise expenditure on fish as a share of expenditure on animal-source foods. Purchasing fish stored on ice is associated with a 12 percentage point higher annual per capita expenditure on fish as a share of expenditure on animal-source foods, which confirms that there is a significant cost associated with the use of ice to maintain the freshness of fish.

Table 4. Determinants of fish consumption and expenditure

Variables	(1) Annualized per capita consumption of fish, as a share of annualized per capita consumption of animal-source foods	(2) Annualized per capita expenditure on fish, as a share of annualized per capita expenditure on animal-source foods
Geographic zone		
Coastal (yes = 1)	0.281***	0.142***
	(0.034)	(0.036)
Household characteristics		
Respondent age (years)	0.001	0.000
	(0.000)	(0.001)
Respondent is male (yes = 1)	−0.080**	−0.067**
	(0.030)	(0.028)
A member of the household completed basic education (yes = 1)	−0.012	0.031
	(0.016)	(0.026)
Household size (persons)	0.004**	0.003*
	(0.002)	(0.002)
Household involved in fisheries sector in past 12 months (yes = 1)	0.002	−0.205**
	(0.024)	(0.096)
Household food budget in the last 12 months (1,000 YER)	−0.000**	−0.000
	(0.000)	(0.000)
Household generates income from livestock (yes = 1)	−0.040**	−0.026
	(0.018)	(0.022)
Market conditions		
Any fish purchased on ice (yes = 1)	0.025	0.117***
	(0.015)	(0.025)
Travel time to nearest market selling fish (minutes)	0.002***	0.002***
	(0.000)	(0.000)
Household experienced a shock in the past 12 months		
Unusually low prices for fishery output (yes = 1)	0.013	−0.152
	(0.027)	(0.090)
Unusually high cost of fishery inputs (yes = 1)	−0.039	−0.069
	(0.033)	(0.041)
Unusually high food prices (yes = 1)	0.004	−0.040
	(0.029)	(0.032)
End of regular assistance from outside of the household (yes = 1)	0.004	−0.019
	(0.012)	(0.023)
Experienced loss of earnings or employment (yes = 1)	−0.040**	−0.036
	(0.017)	(0.023)
Constant	0.621***	0.647***
	(0.051)	(0.063)
Observations	1,600	1,600
R-squared	0.479	0.200

Note: Standard errors clustered at the village level are included in parentheses. Statistical significance of coefficient estimates: *** p<0.01, ** p<0.05, * p<0.1.

Conclusions

Using findings from a representative consumption survey of 1,600 households, this project note addresses the lack of comprehensive, recent evidence on fish consumption patterns in Hadramawt, Yemen. Our data show that fresh fish is the most frequently consumed animal-source food, consumed on three days on average in inland areas and four days in coastal areas, while poultry and meat are consumed only one day per week or less. Fish is also the predominant animal-source food, as 96% of households across the sample reported fish consumption. These rates are higher than those reported in Dey et al. (2026), who looked at the 24 hours preceding their interview, while our recall period was seven days. Poultry and meat are consumed by a smaller share of households, 58% and 6% respectively.

Fish is also the most consumed animal-source food in terms of quantity, both close to the coast and inland. Annualized per capita consumption of fresh fish reaches 28 kg in coastal areas of Hadramawt, which is the highest quantity consumed of any animal-source food in our sample. Inland households consume 9 kg per capita per year, which shows that supply chains are functioning to move fish to inland areas. Inland households consume more canned and processed fish, meat, and poultry than coastal households. However, these quantities are quite low, at around 3 kg per capita per year for processed fish, 1 kg for canned fish, 1 kg for meat, and 7 kg for poultry. Overall, fish consumption is four times higher than meat consumption across the entire sample, and more than 10 times average meat consumption in coastal areas.

We find evidence of significant fresh fish market separation, since quantity and diversity consumed as well as prices differ substantially between coastal and inland areas. While coastal areas benefit from lower prices and direct access to fresh fish, inland prices are much higher, especially for high-value fish such as large tuna. These higher prices reflect the costs associated with transportation and use of ice by traders and retailers, as shown by Belton and Bahurmiz (2026) through qualitative interviews with fish value chain actors in Hadramawt. Quantities consumed and the low prices of fresh fish compared to other animal-source foods underline the centrality of fish in the diet in Hadramawt, and the critical importance of managing fisheries sustainably to ensure future food and nutrition security.

The regression analysis reenforces our descriptive findings and confirms that access to markets and fisheries has a significant influence on per capita fish consumption and expenditures, as shown in Dey et al. (2026). Moreover, our study confirms findings from Dey et al. (2026) and Belton and Bahurmiz (2026) on the existence of developed supply chains that deliver fish to inland areas, while highlighting that these supply chains are mainly for high-value fish species.

We note that there is a demand for lower-value fish inland as well, as illustrated by consumption of fresh sardines. However, the cost of transportation and the need to use ice to maintain freshness during transportation may make it less viable for supply chain actors to deliver lower-value fish to inland areas. Reducing the price of ice could not only decrease the consumer price of the large and small tuna already available in inland markets but also make it more profitable for traders and retailers to offer lower-value fish inland. This could ultimately lead to higher frequency and quantity of consumption of fresh fish in these areas. Moreover, higher consumption and lower prices of canned fish in inland areas highlight the significance of fish processing for food and nutrition security of Hadramawt’s inland population.

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