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Fish for Food Security in Yemen

Insights from the Data in Emergencies Survey

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Key Findings

- Fish is the most frequently consumed animal-source food in Yemen, apart from dairy.
- Fish consumption is highest in coastal southern Yemen but also very common in southern inland districts.
- Nine percent of households in coastal southern Yemen earned income from fishing.
- Earning fishing income is highly positively associated with consumption of fish or meat and with the frequency of fish or meat consumption.
- Sustaining fish stocks and fishing livelihoods is critical to food security and nutrition in southern Yemen.

Fisheries have been a focal sector for rural development and reconstruction efforts in Yemen, reflecting their importance as a source of food and employment. Yet little is known about the extent of fish consumption within Yemen, or the extent to which fishing activities contribute to the food security of fishing households. This information is important, given the centrality of fisheries to current development programming in the country.

In this brief, we analyze data collected by the Data in Emergencies (DIEM) survey. DIEM is an ongoing high-frequency national phone survey, implemented by the Food and Agriculture Organization of the United Nations (FAO). The survey tracks the impact of shocks on food security in 26 food crisis-affected countries to guide humanitarian and development efforts.

We use the DIEM dataset to explore geographic variations in diet composition in Yemen, with a particular focus on fish consumption, and explore associations between household participation in fishing and food security. Key findings from this analysis are presented below.

Box 1: The DIEM Yemen survey

DIEM has been implemented in Yemen at roughly monthly intervals since January 2023. In this brief, we use data from 21 cross-sectional rounds between January 2023 and December 2024. All data were collected through computer-aided telephone interviews using random-digit direct dialing. Approximately 2,500 respondents were interviewed in each survey round, for a total 52,319 respondents in the rounds analyzed here. The survey covers all of Yemen's 22 governorates. Information on diet diversity (the food groups consumed by the respondents within the past 24 hours) was recorded in every survey round. An expanded questionnaire covering household characteristics, employment, shocks, and additional food security indicators was fielded in February–March, June–August, and October of both years. We draw on the full 21 rounds when assessing dietary patterns, and the six expanded survey rounds when analyzing other variables.

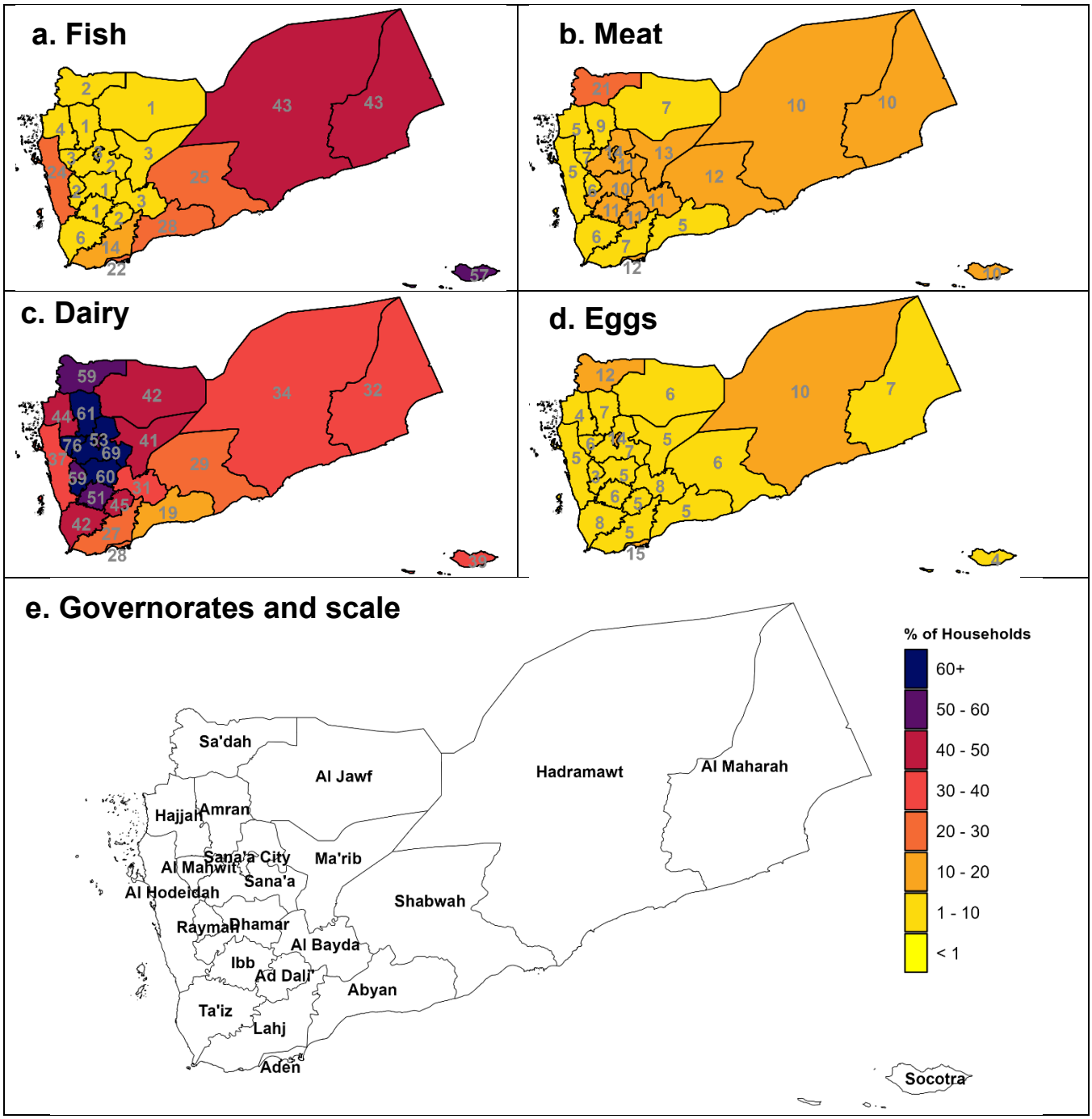
Dietary composition varies widely by geography

Figure 1 depicts spatial variation in the consumption of four nutrient-rich animal-source food groups—fish, meat, dairy, and eggs—obtained by pooling data from all 21 survey rounds to estimate the share of the population in each governorate consuming each food group within a 24-hour period.

Fish: Among the four food groups, fish consumption is the most spatially heterogeneous. Consumption rates are highest in the governorates on the Gulf of Aden, including the island of Socotra, where two-thirds of respondents ate fish within the 24 hours prior to the survey, and in Al Maharah and Hadramawt in the east (>40 percent). Fish consumption is also common in Al Hodeida on the Red Sea (24 percent). In contrast, rates of consumption in landlocked governorates in western and northern Yemen are extremely low (just 1 to 2 percent in several governorates).

Other animal-source foods: Meat consumption is more spatially homogeneous than fish consumption. Between 11 and 14 percent of respondents in coastal and landlocked governorates of southern and central Yemen had eaten meat within the 24 hours preceding the survey. Consumption rates are somewhat lower (around 7 percent) in western provinces, particularly in areas close to the Red Sea. Dairy products are by far the most frequently consumed animal-source foods, consumed by 46 percent of respondents nationally within the past 24 hours. The spatial pattern of dairy consumption is roughly inverse to that of fish: it is highest in the mountainous interior to the west (50 to >70 percent), and lowest, but still common, in governorates bordering the Gulf of Aden (18 to 36 percent). Egg consumption rates are below those of both fish and meat on average, but quite homogeneous spatially, averaging 6 to 8 percent in most governorates.

Figure 1: Governorate-level share of DIEM respondents in Yemen reporting that they consumed (a) fish; (b) meat; (c) dairy; and (d) eggs within the past 24 hours, 2023–2024. (e) map of Yemen, displaying governorate names and scale for maps 1a-d.



Source: Based on data from FAO (2025).

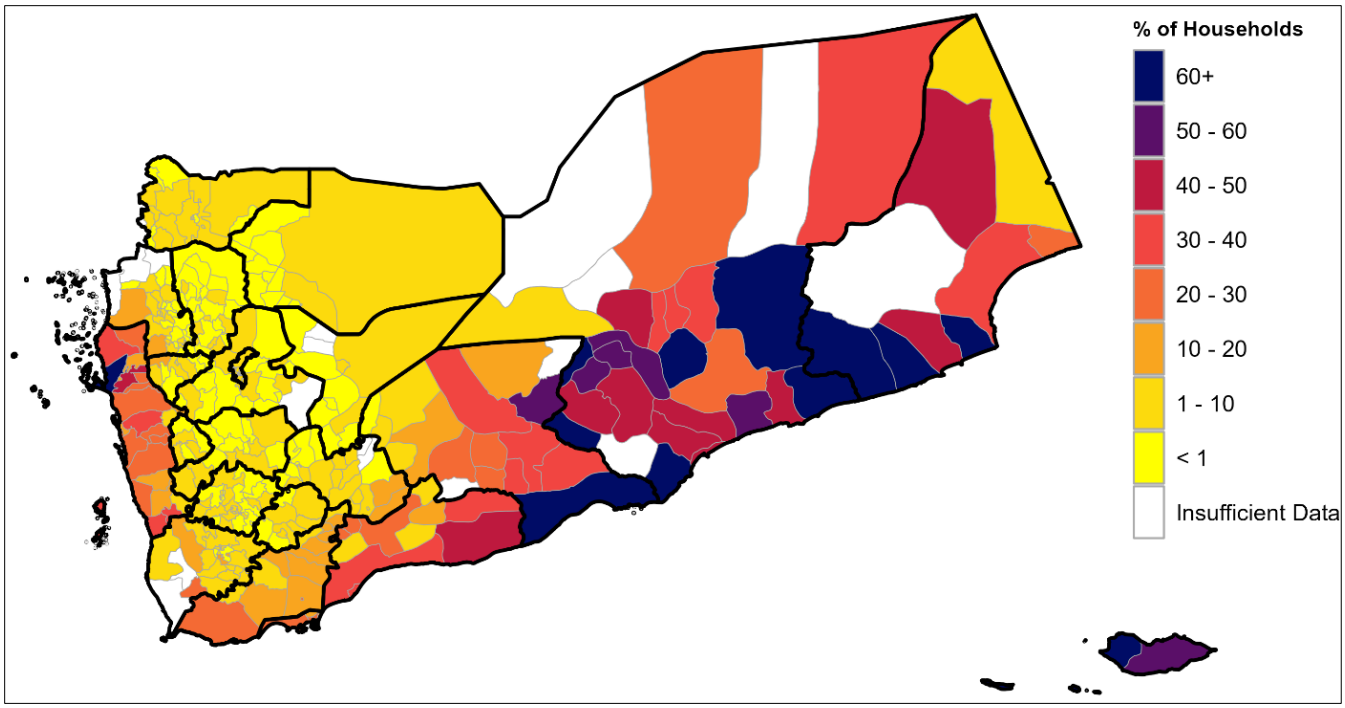
Other foods: Vegetables are widely eaten, with about 40 to 50 percent of households in most governorates reporting consumption within the past 24 hours. The highest consumption rates (50 to 60 percent) are found in lowland governorates bordering the Red Sea (Al Hodeida, Hajjah), which have suitable agroecological conditions for vegetable cultivation, and in nearby Sa'dha and Sana'a. As expected, consumption of cereals (eaten by 99 percent of respondents within the past 24 hours), condiments (91

percent), sugar (70 percent), and edible oils (65 percent) is widespread, with only limited regional variation in rates of sugar and oil consumption, which are slightly higher in governorates to the east. Thirty-eight percent of survey respondents had eaten roots or tubers within the past 24 hours, with slightly higher rates in upland areas of western Yemen than the rest of the country. The share of respondents consuming legumes averaged 35 percent, ranging from roughly 25 to 50 percent across governorates, with no clearly defined geographical pattern.

Fish is a major part of the diet in southern Yemen

At the national level, fish consumption is slightly more common than meat consumption. Fish consumption, within the past 24 hours, was reported by 9.7 percent of respondents and meat consumption by 9.1 percent. Fish consumption is concentrated in southern Yemen, where 24 percent of households consumed fish, compared with 5 percent in the north. Well over 40 percent of households in most coastal districts of Al Maharah, Hadramawt, and Shabwah reported consuming fish within the past 24 hours, and more than 60 percent in several locations (Figure 2). Some caution is required in interpreting district-level results because DIEM is designed to be statistically representative at the governorate level, not the district level. Nevertheless, these figures indicate strongly that fish consumption is extremely common in coastal southern Yemen.

Figure 2: District level share of DIEM respondents in Yemen reporting fish consumption within the past 24 hours, 2023–2024



Source: Based on data from FAO (2025).

Notably, fish consumption rates are also high in many inland districts in the south, where fish was eaten by 20 to 50 percent of respondents within the past 24 hours, suggesting the presence of robust domestic supply chains moving fish from the coast to the interior (Figure 2). In contrast, in many southern districts, only 1 to 10 percent of respondents reported eating meat within the past 24 hours.

Thus, fish likely makes a major contribution to micronutrient and protein intake in southern Yemen, which suggests that efforts to maintain and expand access to fish must play a central role in food-based strategies to enhance food and nutrition security in this region.

Fishing activity enhances the food security of fishing households

Nationally, only 1 percent of households reported earning income from fishing within the preceding three months, but this figure masks large regional variations. Across all survey rounds, significantly more households reported fishing income in southern Yemen (3.2 percent) than in the north (0.5 percent).

As expected, fishing activity is highly concentrated in coastal districts. Across all survey rounds, an average of 9.4 percent of households in coastal districts of southern Yemen and 3.4 percent in coastal districts of northern Yemen reported obtaining income from fishing in the past three months, compared to 0.2 percent in landlocked districts in both northern and southern Yemen.

Interestingly, the share of households in coastal governorates of southern Yemen engaged in fishing declined steeply between 2023 and 2024, dropping from 14.2 percent to 4.2 percent (significant at $p<0.05$). Conversely, over the same period, the share of households participating in fishing activities in coastal northern Yemen rose from 2 percent to 4.5 percent, although this change was not statistically significant. These trends may be explained by acute fuel shortages in southern Yemen during 2024 that could have curtailed fishing activities or made fishing prohibitively expensive, while the declining intensity of conflict in northern Yemen may have allowed an increase in fishing.

The largest annual decline in fishing activity in coastal southern Yemen was reported in the June–August survey period. In June–August 2023, 9 percent of households reported that they had earned fishing income during the prior three months, but only 1 percent did so during the same period in 2024 (though this change was not statistically significant). The share of households reporting participation in fishing was similar the February–March and October periods in both years, at around 2 percent. Otherwise, seasonal variation in fishing is limited, rising to 5.3 percent in June–August (the average across the two years), but this difference is not statistically significant. This suggests that fishing is a year-round activity, though the intensity of fishing effort and species targeted may vary by season.

The year-round nature of fishing is reflected in fish consumption patterns. The share of households in southern Yemen consuming fish did not vary significantly by season (25 percent in February–March and October, and 23 percent in June–August). The share of respondents in southern Yemen consuming fish within the past 24 hours fell slightly from 2023 to 2024, from 26 percent to 22 percent, but this change was not statistically significant. These findings underline the importance of fishing as a source of both employment and food in southern Yemen.

We conducted logistic regression analysis to evaluate associations between household participation in fishing and food security outcomes. Key results are presented in Table 1. Controlling for other factors that may affect food security (listed in the table notes), households receiving fishing income were more likely to have consumed fish and other animal-source foods in the past 24 hours compared with those who did not participate in fishing. Among households earning income from fishing, the likelihood of consuming fish and animal-source foods in the past 24 hours are 4.6 and 3.8 times higher, respectively, compared with households without fishing income. Both associations are statistically significant at the 1 percent level ($p<0.01$). No other variable is as strongly associated with increased odds of animal-

source food consumption, and only one variable (residing in southern Yemen) is equally strongly associated with fish consumption.

Table 1: Associates of participation in fishing and food security

	Household consumed fish in the past 24 hours (0/1)	Household consumed any animal source food in the past 24 hours (0/1)	Number of days HH consumed meat or fish in the past 7 days	Dietary Diversity Score (HDDS)	Probability of moderate food insecurity	Probability of severe food insecurity
	Odds ratio		Coefficient			
Household had income from fishing in past 3 months (0/1)	4.56*** (1.762)	3.79*** (1.712)	2.44*** (0.683)	0.67*** (0.223)	−0.16* (0.096)	−0.05** (0.021)
Governorate fixed effect	Yes	Yes	Yes	Yes	Yes	Yes
Other controls†	Yes	Yes	Yes	Yes	Yes	Yes

Source: Based on data from FAO (2025).

Note: †Other controls include location (North, South), geography (landlocked, coastal), year (2023, 2024), season (February-March, June-August, October), gender and education of the household head, household residence status (permanent or displaced), household exposure to shocks, household employment in agriculture/forestry, livestock rearing, casual wage labor, nonfarm enterprise, nonfarm self-employment, remittances and transfers, the share of household's income earning activities in which women participated, and the log value of disorder events in the district (a measure of insecurity and exposure to conflict). * p<0.1, ** p<0.05, *** p<0.01.

Household participation in fishing is also associated with increased frequency of fish or meat consumption, equivalent to consuming fish or meat on an additional 2.4 days each week as compared with non-fishing households. The relationship between fishing activity and diet diversity is also positive. Holding other factors constant, participation in fishing is associated with a 0.67 point increase in diet diversity, equating to consumption of close to one additional food group within the past 24 hours. These results are all highly significant ($p<0.01$). Moreover, earning income from fishing is negatively correlated with the probability of a household being moderately or severely food insecure, equivalent to a 16 percent reduction in the probability of moderate food insecurity ($p<0.01$) and a 5 percent reduction in the probability of severe food insecurity ($p<0.05$).

Conclusions

Fish is the most highly consumed animal-source food in Yemen, apart from dairy. Fish consumption is concentrated in the south, where it is the most frequently consumed animal-source food. Fish consumption is highest on the coast, but also very common in inland districts of the south. This finding indicates (1) the presence of robust supply chains distributing fish from the coast to the interior, (2) that frequent fish consumption is not limited to fishing communities, and (3) that much of Yemen's fish catch is consumed domestically. Overall, the high level of consumption underlines the centrality of fish for food and nutrition security in southern Yemen.

Fish consumption is more common than meat or egg consumption nationally, and much more so in the southern region. Given that animal-source foods are particularly nutrient dense, it can be inferred that fish makes a major contribution to the micronutrient and protein intakes of inhabitants of southern

Yemen. Importantly, fish consumption rates are quite constant over seasons, indicating that supply is quite stable, contributing to year-round availability.

Participation in fishing activities is concentrated in coastal districts of southern Yemen, where 9 percent of surveyed households earned income from fishing in the three months prior to the survey. Like fish consumption, rates of participation in fishing do not vary widely by season. However, the share of households in coastal governorates of southern Yemen engaging in fishing declined steeply from 2023 to 2024 (from 14.2 to 4.2 percent), with the largest drop reported in the June–August period. We hypothesize that this pattern may reflect acute fuel shortages during this period in 2024. Earning income from fishing is the variable most highly correlated with the probability of consuming fish or meat, and is strongly positively associated with the frequency of fish or meat consumption

Together, these findings suggest that efforts to maintain and expand access to fish must play a central role in food-based strategies to enhance food and nutrition security in this region, and that policies and programs that support and sustain fishing livelihoods and the fish stocks on which they depend have a critical role to play in securing food and nutrition in southern Yemen.

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