

Angling fish for food: Study finds recreational fishing accounts for 11% of reported harvest in inland fisheries

May 13 2024, by Kathrin Anna Kirstein

Nutrient supply	<p>Per recreational fisher species-specific biomass harvest for consumption</p> <p>Species-specific edible proportion</p> <p>Species-specific nutrient content</p>	$NS_{k,j} = \sum_{i=1}^{i=m} \frac{B_{k,i} \times e_i \times C_{i,j}}{N_k}$	<p>where NS_j is the nutrient supply per recreational fisher of nutrient j in country k, m is the total number of species in country k, $B_{k,i}$ is the harvested biomass of species i in country k, e_i is the edible proportion of species i, $C_{i,j}$ is the nutrient composition of species i and nutrient j, and N is the total number of inland recreational fishers in country k.</p>
	<p>Total per capita nutrient supply from aquatic foods</p>	$RNS_{k,j} = \frac{NS_{k,j}}{AF_{k,j}}$	<p>where $RNS_{k,j}$ is the relative nutrient supply per inland recreational fisher of nutrient j in country k, $AF_{k,j}$ is per capita nutrient supply from all aquatic foods for nutrient j in country k (from the Global Nutrient Database).</p>
TCUV	<p>Per recreational fisher species-specific biomass harvest for consumption</p> <p>Proxy market price (whole fish)</p>	$TCUV_k = \sum_{i=1}^{i=m} \frac{B_{k,i} \times P_{i,k}}{N_k}$	<p>where $TCUV$ is the total consumptive use per inland recreational fisher in country k, m is the total number of species in country k, $B_{k,i}$ is the harvested biomass of species i in country k, P_i is the proxy market price of species i (whole fish) in country k and N is the total number of inland recreational fishers in country k.</p>
	<p>GDP per capita corrected for PPP</p>	$RTCUV_k = \frac{TCUV_k}{GDP_k-PPP_k}$	<p>where $RTCUV_k$ is the relative total consumptive use per inland recreational fisher in country k, GDP_k-PPP_k is per capita GDP in country k corrected for PPP.</p>
Climate vulnerability	<p>Species-specific biomass harvest for consumption</p> <p>Species-specific climate vulnerability</p>	$TCV_k = \sum_{i=1}^{i=m} \frac{B_{k,i} \times CV_i}{B_k}$	<p>where TCV is the total climate vulnerability in country k, m is the total number of species in country k, $B_{k,i}$ is the harvested biomass of species i in country k, CV_i is the climate vulnerability of species i (not country specific) and B_k is the total harvested biomass of all species in country k.</p>

Methods for examining the importance of consumed inland recreational fish.
 Credit: *Nature Food* (2024). DOI: 10.1038/s43016-024-00961-8

Rod and reel fishing is much more than a recreational activity: It makes an important contribution to the diet in many regions of the world. This

is shown by an international team of researchers, including Robert Arlinghaus, Professor for Integrative Fisheries Management at the Leibniz Institute of Freshwater Ecology (IGB) and Humboldt-Universität zu Berlin.

The global study has been [published](#) in *Nature Food*. The researchers estimate that recreational fishing accounts for more than 11% of reported harvest in [inland fisheries](#) worldwide. Especially in countries such as Canada, Poland, Argentina, Scandinavia and Germany, self-caught freshwater fish is important for nutrition and micronutrient supply.

Due to [climate change](#) and direct human impacts on freshwater ecosystems, the productivity of important fish species such as trout and salmon is declining, affecting the nutritional services offered by rivers and lakes.

"We have investigated the nutritional and economic importance of fish consumption from recreational fishing in 81 countries and refute the common assumption that recreational fishing plays only a minor role in feeding the world's population. On the contrary, for anglers, self-caught fish is an important contribution to self-sufficiency in protein and micronutrients," said Prof. Arlinghaus.

Eleven percent of the world's freshwater fish are caught by anglers

Around 280 million recreational anglers catch more than 1.3 million tons of freshwater fish every year. This means that recreational fishing contributes significantly to the total fish yield of inland fisheries worldwide—more precisely, 11.3% of the reported 11.5 million tons of freshwater fish are caught by anglers. However, these figures do not

appear in global fishing statistics, as recreational fishing is traditionally not recorded there.

Yet, recreational fishing is the dominant form of inland fishing in all industrialized countries today. In Germany alone, anglers take about ten times more fish from inland waters than commercial fisheries. There are more than 3 million anglers in the country.

A lot of self-caught fish is consumed in Germany

By country, Canada, Poland and Argentina consume the most fish per [angler](#) from inland waters. Germany is also in the top ten in 6th place.

"The fact that Germany is so far ahead is due to the popularity of the hobby. On the other hand, in Germany, going fishing to catch for dinner is considered good practice. This means that many anglers also fish to eat the fish they catch," explained Arlinghaus.

Salmonid species such as trout and salmon, perch, zander, walleye, and pike are popular among anglers worldwide. In Europe and especially in Germany, carp and other carp-like fish (cyprinids), eel and catfish are also popular. In Germany, trout and cyprinids dominate in the harvest of anglers in roughly equal proportions.

Contribution of self-caught fish to a healthy diet

The researchers analyzed the importance of recreational fishing for the [self-sufficiency](#) in important nutrients in each country. One important factor is vitamin B12, an essential micronutrient that is abundant in fish and other seafood and is important for human health, including bone development, red blood cell formation and nerve function.

"The nutritional benefits of harvested fish are highly dependent on the fish species and the amount of fish consumed, both of which we took into account in our study calculations," said Arlinghaus, explaining the results.

In general, the nutritional contribution of home-caught fish as a proportion of total fish and seafood consumption in society is particularly high in Austria, Belarus, Argentina, Belgium and Poland. In the case of vitamin B12, anglers in Canada and Bangladesh were the main beneficiaries, as these people do not get enough vitamin B12 from other fish and seafood.

Total consumption value of harvested fish is around 10 billion US dollars per year

The researchers determined the total consumptive value of [freshwater fish](#) harvested by recreational anglers based on comparable offers at local market prices. Worldwide, the total consumption value of fish caught for personal consumption was estimated as US\$9.95 billion per year. Canada (\$2.74 billion), China (\$2.57 billion) and the United States (\$2.38 billion) led the way.

In seven other countries, including Germany, the value was over 100 million US dollars per year. "This confirms earlier studies we presented for Germany that [recreational fishing](#) is an important economic factor in this country," said Arlinghaus.

Threats by climate change

Recreational fisheries are also facing the challenges of climate change: the success of adaptation will vary depending on the fish species and climatic conditions. The researchers identified Iceland, New Zealand,

Denmark and Kenya as the countries with the highest climate sensitivity of fish species consumed in recreational fisheries.

Looking at the countries where anglers consume the most fish, Canada and a number of European countries, including Germany, are among the most vulnerable. In addition to climate change, other environmental changes, such as damming of rivers, also have a negative impact on the productivity of fish stocks.

Inland water management should take greater account of nutritional aspects

"Our findings highlight that the nutritional aspect of recreational fisheries should be more fully integrated into the management of inland waters. Climate change, land and water use, river fragmentation and other large-scale influences are already dramatically changing global inland fisheries, including recreational fisheries.

"The consequences of declining fish stocks and their impact on nutrition should be taken into account, not the least because self-caught fish is among the most sustainable animal protein people can gather," concluded Arlinghaus.

The authors point out that more data is needed to reduce the uncertainties in these estimates and to investigate further issues. This includes possible negative health effects, such as the risk of ingesting toxins from self-caught fish.

More information: Abigail J. Lynch et al, Inland recreational fisheries contribute nutritional benefits and economic value but are vulnerable to

climate change, *Nature Food* (2024). [DOI: 10.1038/s43016-024-00961-8](https://doi.org/10.1038/s43016-024-00961-8)

Provided by Humboldt-Universität zu Berlin

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