

34 Fishery Product Consumption

34.1 Per Capita Fishery Product Consumption

The readily available information on the consumption of fish and other fishery products is given in the country and territory chapters. Table 34-1 is a compilation of the ranges in estimates of fish¹ consumption rates for each country and territory from various sources as listed in the chapters and in previous Benefish studies (Gillett 2009; Gillett and Lightfoot 2001). Information in the “range of estimates” column comes from fisheries surveys, dietary surveys, and household income and expenditure survey (HIES) work, while that in the “Bell et al.” column comes (with one exception) from HIES work (Bell’s estimates for annual per capita consumption are included to show the large difference between his estimates and others). Figure 34-1 graphs the information from Table 34.1 (minus the outliers).

1 Fish is used to mean finfish and edible invertebrates.

Table 34-1: Estimates of Annual Per Capita Fishery Product Consumption

Country Territory	Range in Estimates (from many surveys) *(kg/person/year)	Bell et al. (2008) (kg/person/year)	Other Information
Cook Islands	47.0–71.0	34.9	Most fish consumption studies are focused on Rarotonga. Some studies appear to have used food value while most have used whole fish equivalent.
Fiji	44.0–62.0	20.7	The annual supply of fish to the Suva area by the locally based offshore fleet is about 11.8 kg/person.
FSM	72.0–142.0	69.3	Annual per capita consumption of domestic coastal fishery products is estimated by present study to be 49.9 kg. To this must be added consumption of offshore fishery products and imports.
Kiribati	72.0–207.0	62.2	Rejected fish from purse seine transshipment in 2014 was about 7.5 kg per resident of South Tarawa and Betio.
Marshall Islands	38.9–59.0	–	If the coastal fisheries production in 2014 of 4,500 mt (estimated by the present study) is divided by the population, the result is 82.5 kg/person/year – but this does not consider reef fish exports, non-residents in Marshall Islands who consume local fish, or domestic consumption of the leakage from tuna transshipment operations.
Nauru	46.7–63.9	55.8	The 46.7 kg was from the late 1990s. The fish consumption rate is likely to have changed remarkably since then.
Niue	49.0–118.9	79.3	Two types of estimates from the SPC ProFish survey results suggest very different consumption rates: 112 kg vs 51 kg.
Palau	84.0–135.0	33.4	In 2014 offshore fishing (longline and pole-and-line) contributed 10.3 kg/person/year. The estimation of fish consumption is complicated by a large tourist population.
PNG	18.2–24.9	13.0	The Bell et al. (2008) estimate was from a non-HIES survey.
Samoa	46.3–129.5	87.4	The latest survey (Titiiti et al. 2014) gave the highest consumption by far: finfish (46.15 kg/year), invertebrates (54.74 kg/year), and canned fish (2861 kg/year).
Solomon Islands	32.2–45.5	33.0	The relatively new "salt fish" trade in Honiara consists of selling damaged fish from tuna transshipment and equates to residents of Honiara consuming 6.7 kg of salt fish per year.
Tonga	25.2–35.0	20.3	Offshore fishery production equates to 1.6 kg/person/year for all of Tonga.

Table 34-1: continuation

Country Territory	Range in Estimates (from many surveys) *(kg/person/year)	Bell et al. (2008) (kg/person/year)	Other Information
Tuvalu	85.0–146.0	110.7	A Fisheries Department report summarised the results of many studies on the level of consumption of marine resources in Tuvalu: consumption rates vary from island to island, but are in the range of 100–200 kg/person/year.
Vanuatu	15.9–25.7	20.3	
American Samoa	15.5	–	It is difficult to determine the actual annual per capita consumption of fish in American Samoa because of (1) the fish from the locally based offshore fleet that is consumed domestically, (2) the “leakage” of fish from foreign-based offshore fishing, (3) imports of fishery products, and (4) the products of the American Samoa canneries that are domestically consumed.
French Polynesia	46.5–70.3	70.3	In a 2009 study various studies giving fish consumption in French Polynesia were examined to give rates for the various island groups: rural Tahiti (19.3 kg/person/year), Society Islands except Tahiti (43.7), Austral Islands (43.7), Marquesas (21.9), and Tuamotu/Gambier (150).
Guam	20.4–27.2	–	
New Caledonia	21.6	25.6	The production from offshore fisheries equates to about 26.2 kg/year for each of the 100,000 residents of Noumea.
Northern Marianas	23.0	–	Estimating fish consumption is complicated by the large amount of canned and non-canned seafood imports, the presence of a large tourist population, and a subsistence fishery that was not covered by the 2005 HIES nor explicitly by current fishery monitoring programmes.
Pitcairn Islands	153	–	Only 49 residents.
Tokelau	119.4	–	There is a substantial amount of imported protein food products.
Wallis and Futuna	–	74.6	The present study estimates the 2014 annual consumption of domestic fishery products to be 68.7 kg per capita, but this does not consider imports.

* Single-figure estimates are the result of the only recent and reliable estimate available
 Note: Outlying estimates have been eliminated
 Source: The present study, and Gillett and Lightfoot (2001)

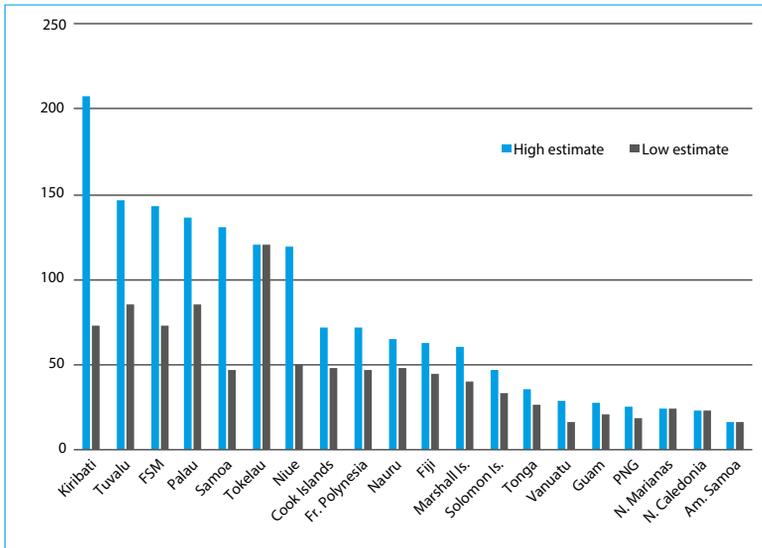


Figure 34-1: Ranges in Estimates of Annual Per Capita Fish Consumption (kg/person/year)

Some observations on the above table and graph are as follows:

- In general, the countries that are made up mostly of atolls (Kiribati, Tuvalu, FSM) have the highest fish consumption rates. The relative position of Marshall Islands on the graph is counterintuitive (as an atoll country Marshall Islands would be expected to have a relatively high annual per capita consumption, but it does not), while the relatively low position of Tokelau can be explained by its close association with New Zealand, and consequently its relative affluence which allows high levels of imports of protein alternatives to fish.
- The countries that have the lowest fish consumption rates are those that either have large inland populations (PNG, Vanuatu) or are relatively affluent.
- Several of the countries that have moderately high fish consumption (FSM, Palau, Samoa) have locally based longline fleets.
- The notes in the table suggest growing consumption of damaged fish from purse seine operations – and at least some effectiveness of measures to prevent those fish from being dumped.
- The countries with very high consumption rates also have very large ranges in the rates.

The last point deserves some additional attention as it may provide some insight into the accuracy of fish consumption estimates. It also may be worthwhile to explore the issue, as the high end of the ranges would make some Pacific Island countries among the highest per capita consumers of fish in the world. Box 34-1 tracks the origins of the high and low ends of the range of fish consumption for Kiribati. The analysis shows that both estimates are quite dated. It also suggests that the upper end of the range is likely to be more credible than the lower end.

Box 34-1: Investigating the Large Range in Estimates of Per Capita Fish Consumption in Kiribati

- The high end of the range of per capita fish consumption is from Nube (1989) who reported that canned fish imports from 1974 to 1986 ranged from 112 mt to 312 mt per year. Using information from the 1985 census, Nube calculated the daily per capita fish consumption for 18 islands in the Gilbert and Line groups. The results ranged from 0.45 kg in South Tarawa to 2.86 kg in Arorae. Of the 18 islands listed, 11 of the islands (or 61%) had a per capita fish consumption rate greater than 1 kg/day.
- The low end of the range of per capita fish consumption is from World Bank (1995) which stated that: "Per capita supplies [of fish] available for consumption are consequently quite high ranging between 72 and 75 kilograms per year over the last decade, as reported to FAO."
- The FAO consumption figures come from the FAO Food Balance Sheets, which use production, imports, and exports to determine the total supply of fish and per capita supply.
- FAO generally uses fishery statistics reported to them by government fisheries agencies. The Kiribati Fisheries Division Annual Report 1994 (Fisheries Division 1995) shows there were no estimates of annual national catch made for that year and does not mention annual catch estimates for the previous several years.
- An examination of FAO catch data for Kiribati by researchers from the University of British Columbia (Zylich et al. 2014) shows that: "The reconstructed total catch of Kiribati for the time period 1950–2010 was approximately 14% higher than the catches reported by the FAO on behalf of Kiribati".

The fish consumption information in the table and the figure can be placed in a wider context:

- Based on the predicted age structure of populations in the Pacific until 2030, the age–weight relationships typical of the region, and the fact that fresh fish consists of about 20% protein, an annual average per capita fish consumption of 34–37 kg provides about 50% of the

recommended protein intake for people in Pacific Island countries and territories (Bell et al. 2009).

- Most of the Pacific Island countries and territories exceed by a large margin the world average per capita fishery product consumption rate of 15.4 kg (FAO 2015).
- Loke et al. (2012) state that the three countries with the highest annual per capita consumption of seafood in the world are Maldives (142.2 live kg), Saint Helena (92.6 live kg) and Iceland (90.8 live kg). An FAO project estimated that Maldives has the highest annual per capita consumption of fish in the Asia-Pacific region, i.e. 185.9 kg (Sugiyama et al. 2004).

34.2 Measuring Fish Consumption

In the table above, comparing the “range of estimates” column to the Bell et al. (2008) estimates for the annual per capita consumption, the latter estimates are often less than the lower end of the range. This is consistent with an observation on the use of HIES for fisheries work: “A feature common in many countries of the Benefish Study is to have the coastal fisheries production estimated by a HIES to be relatively low. The HIES² generally suggests fish catches significantly smaller than that estimated by other survey techniques” (Gillett 2009). On the other hand, despite the imperfections of the HIES for fisheries work, across the region the HIES methodology is relatively uniform compared to the variety of techniques used to derive the information in the “range of estimates” column.

There are several other examples of different surveys producing different estimates of national per capita fish consumption. One is the Kiribati case in the box above. Another is a single SPC ProcFish study in Niue in which two different assessments suggested very different annual consumption rates (51 kg vs 112 kg). In the earlier Benefish study (Gillett 2009) there is an example of the difficulties in comparing fish consumption studies:

In one Pacific Island country a fish consumption study in 1998 (unknown methodology), was directly compared to a study in 2001 (used a mixture of food weight and whole fish equivalent) and one in 2006 (that used food weight). Changes in per capita consumption between the surveys were calculated and attributed to specific factors (i.e. ciguatera, fisheries management measures).

² This statement refers to the conventional HIES, and not the “fisheries-friendly” HIES discussed in Chapter 29.

Several observations can be made from the above. One is that the determining of per capita fish consumption in the region is currently a very inexact science. Another is that comparisons between different fish consumption studies must be done cautiously, and avoided unless the methods used by the studies are known and they are either the same or can be corrected so that equal features are being compared. A third observation is that, although different methodologies can give different results, the trend in consumption over time could be more useful than absolute values. These points emphasise the importance of using consistent techniques to monitor fish consumption.

Other issues to bear in mind when using the results of fish consumption studies are as follows:

- Terminology – for example “per capita fish consumption” can be the measurement of two very different things: (a) food ingested or (b) the whole weight of the fish used to produce the ingested food; or “seafood” is sometimes used, but this can create confusion in countries with a large production from freshwater fisheries.
- The food items being compared – whether just finfish, or all aquatic animals, or even aquatic plants are included.
- Canned fish – whether this is included and whether the quantity in the can (all edible) is being added to whole fish equivalents (not all edible).
- Fish imports and exports – (a) whether these are included, (b) how they are included in countries that have unreliable export statistics, and (c) determining from the statistics whether imports consist of whole fish or just the edible parts.
- Tourists – whether the tourist population is included and whether there is any correction for differential consumption by tourists.

A final observation is that a surprising number of comments on fish consumption in the region are simply wrong. As one of many examples, a report by the Asian Development Bank (ADB 2014) states:

Solomon Islands has one of the highest per capita fish consumption rates in the world. Bell et al. (2009) estimated that the average annual per capita fish consumption in urban areas was 45.5 kilogram (kg) and 31.2 kg in the rural areas, while the national average was 33 kg (90% consisted of fresh fish). However, these figures may be an underestimation (Weeraratunge et al. 2011) since Pinca et al. (2009) estimated annual per capita fish consumption between 98.6 kg and 110.9 kg.

The reality is that Solomon Islands is far from having one of the highest fish consumption rates in the world (it is even below average for the countries in the Pacific region) and the range cited in the Pinca et al. (2009) study was not for the whole country, but rather for four villages chosen because “they had active reef fisheries” (Pinca et al. 2009), something that is not representative of the entire country.

34.3 Fish Consumption Rates and Fisheries Management

Per capita fish consumption data are important in determining the impacts of policy changes and management interventions, especially on small-scale fishers. Protection of village fish food supplies is arguably the most important objective of the management of subsistence fisheries in the Pacific Islands. Monitoring per capita fish consumption is important in determining the degree to which this objective is being achieved

There are two other considerations regarding monitoring of fish consumption rates in relation to small-scale operations:

- The use of marine protected areas (MPAs) is now widespread in the Pacific Islands and it is likely that this will increase. MPAs are established for many worthwhile objectives, including increasing the abundance of important species, protecting other species, biodiversity conservation, and increasing the value of non-extractive uses (e.g. dive sites). To ensure that these multiple objectives are not being achieved at the expense of the diets of villagers living in the area, some monitoring of per capita fish consumption is important.
- In several countries the objective of governments supporting aquaculture is to improve nutrition (“aquaculture for food security”). It would therefore seem logical to monitor per capita consumption of aquaculture production to determine if the support to aquaculture is justified on nutritional grounds.

In a wider context, fish consumption rates and their change over time can provide a powerful justification for emphasising improved government attention to fisheries management. Bell et al. (2008) studied per capita fish consumption in the region and concluded: “Forecasts of the fish required in 2030 to meet recommended per capita fish consumption, or to maintain current consumption, indicate that even well-managed coastal fisheries will only be able to meet the demand in 6 of 22 PICTs.”