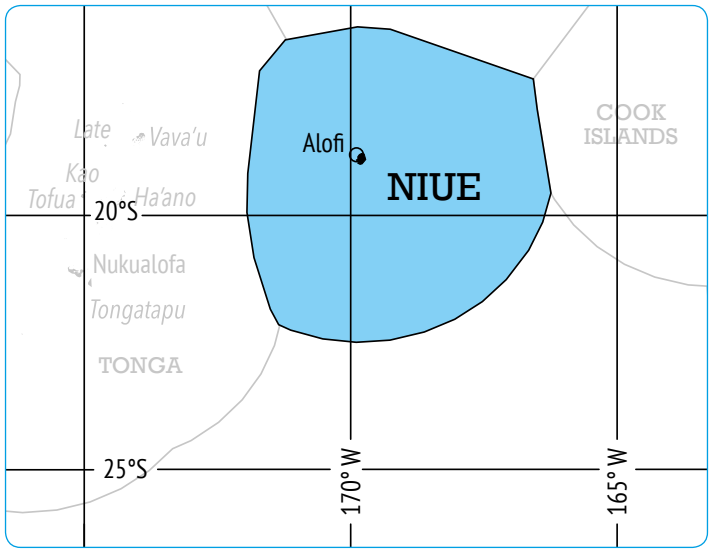
12 Niue



12.1 Volumes and Values of Fish Harvests in Niue

Coastal Commercial Catches in Niue

The following describe historical attempts to estimate the production from coastal fisheries:

- McCoy (1990) estimates the total fisheries production to be 100–150 mt, half of which comes "from the reef" and half from "beyond the reef."
- Dalzell et al. (1993), using information from an SPC nutrition survey carried out in Niue in 1978, estimate the total catch to be about 115 mt per year, with an additional 4.9 mt per year exported to New Zealand during periods of direct air connections.
- Dalzell et al. (1996), using reference material from 1990, estimate that the annual production from the subsistence fisheries was 103 mt, worth

US$471,504 (or about NZ$7.64 per kg), and the production from the commercial fisheries was 12 mt, worth US$54,720.

- The Niue Department of Agriculture, Forestry and Fisheries has historically used the figure of 120 mt as the production from all Niue fisheries.
- During the work done in compiling the national accounts, a survey of 20 households (3.6% of all households on Niue) was carried out in June 2000. The results of the survey indicated that the annual catch from the subsistence fisheries was about 194 mt, worth NZ$315,640. (Lewington 2000).
- Gillett and Lightfoot (2001) considered the results of the studies above, and other information, and ventured an estimate of a coastal commercial catch of 12 mt (worth NZ$96,000), and a coastal subsistence catch of 194 mt (worth NZ$315,640).
- The SPC ProcFish programme surveyed Niue in June 2005. As part of that work estimates were made of the annual production in various categories of fishing. The report of the survey (Kronen et al. 2008) states: (a) the survey data suggests a total annual reef finfish catch of 53.4 mt, (b) there is an estimated production of 76.2 t/year from mid-water and trolling fishing, (c) applying sample data to the total number of possible invertebrate fishers in Niue, the total annual impact in biomass (wet weight) removed amounts to 35.3 t/year. This equates to a total annual harvest of 164.9 mt.
- Gillett (2009) considered all of the above studies (except the ProcFish work, as the results were not available), recent information on factors that could affect coastal fishery production, recent surveys, and current prices of fish. Coastal fisheries production in 2007 was estimated to be 150 mt, comprising commercial production of 10 mt (worth NZ$80,000 to fishers) and subsistence production of 140 mt (worth NZ$840,000).

According to Niue fisheries officials, estimates of total fisheries production for coastal fisheries have not been made in Niue since 2008. In examining the above studies it appears that the ProcFish work was the most methodical in the way that coastal fisheries production was estimated. The approach followed in the present study is to assume that the ProcFish estimate is reasonably accurate, and to adjust it by factors that are likely to have affected production in the period since that estimate was made.

In recent years there have been some changes that could have affected coastal fisheries production. According to an individual knowledgeable in Niue fisheries (J. Tamate, per. com. December 2015), these include the following:

- The locally based longliners ceased operations in late 2007. When those vessels operated from Niue (2005–2007) there was an increase in the supply of fish (i.e. sales of longline bycatch), resulting in lower-priced coastal fish. When the operations ceased in late 2007 the price increased.
- To compensate coastal fishers for the lower prices for coastal fish due to the longlining, the government introduced a fuel subsidy in 2006 to ensure local fishers would remain in the fishery. The subsidy was removed in late 2015.
- In the period 2007 to 2014 the population of Niue dropped from 1,587 to 1,499, representing a reduction of 5.9% (SPC's PRISM website information).
- Major cyclones have had substantial negative impacts on coastal fisheries. The last serious cyclone to hit Niue was cyclone Heta in 2004.
- The number of fish aggregation devices has been relatively constant in the last decade.
- An international fishing competition was started in 2010.
- There was an increase in the number of canoes and fishing activities from 2010. In 2014 one village launched 40 new canoes.
- Average prices paid to fishers increased, from NZ$7 to NZ$9 per kg in 2007, to NZ$12–15 in 2014.

The above list of factors suggests there are influences that would tend to both increase and decrease coastal fisheries production, with no remarkable net affect. This is consistent with information supplied by Niue fisheries officials, who believe that production has not changed much since the 2005 ProcFish work.

Using the above information selectively, it is estimated that the coastal fisheries production in Niue in 2014 was 165 mt, made up of 11 mt of commercial catch (worth NZ$148,500 to fishers) and 154 mt of subsistence catch (worth NZ$1,455,300 to fishers).

Coastal Subsistence Catches

Following the above approach, the coastal subsistence fish catch in Niue in 2014 is estimated to be 154 mt. Using the farm gate system of valuing subsistence production (discounting prices for commercial fish by 30%), this would be worth NZ$1,455,300 to fishers.

Locally Based Offshore Catches

Tafatu (2006) states that, at the beginning of 2005, Niue began licensing longline vessels to fish under charter arrangement. The vessels, ranging in size from 10 to 29 meters, fished into the new government joint venture fish processing facility, Niue Fish Processors Ltd. In 2006 there were 13 longliners based in Niue.

The Director of Niue's Department of Agriculture, Forestry and Fisheries indicates that production from the boats reached a maximum in 2006 and early 2007. Fishing operations stopped in December 2007. (B. Pasisi, per. com. December 2008).

There has been no locally based offshore fishing in Niue since 2007. The one small "alia" catamaran longliner operating since 2013 is considered to be part of the coastal fleet for the purposes of the present study.

Foreign-Based Offshore Catches

Fisheries Division (2015) states:

> A total of five out of eight vessels that were licensed to fish in 2014 engaged in fishing. These vessels were flagged to Fiji, Cook Islands, United States and Taiwan. As expected, albacore made up the majority of the catches, followed by yellowfin and bigeye. The effort is slightly lower in 2014 compared to 2013 and it was concentrated on the north western part of the island.

US purse seine vessels are authorised, under a multilateral treaty, to fish in Niue waters, but actual fishing in Niue waters by those vessels has not occurred in many years.

Estimates of the volumes and values of catches of the four main commercial species of tuna in the area of the Western and Central Pacific Fisheries Commission (WCPFC) area have been made by the Forum Fisheries Agency using data sourced from the Oceanic Fisheries Programme of the Pacific Community. The volumes and values can be determined using FFA (2015).

Table 12-1, below, adjusts those volumes for bycatch. The values in the table are adjusted: (a) to account for the value of the bycatch, and (b) to be in-zone values (i.e. overseas market prices, less transport charges to those markets).

Table 12-1: Foreign-Based Offshore Catches in the Niue Zone

	2010	2011	2012	2013	2014
Adjusted catch volume (mt)	322	0	0	597	547
Adjusted catch value adjusted (US$)	718,540	0	0	1,306,626	1,519,487

Source: FFA (2015)

It can be seen from the table that the 2014 foreign based offshore catch in the Niue zone was 547 mt of tuna and bycatch, with an in-zone value of US$1,519,487 (NZ$1,944,943).

Freshwater Catches

There are no freshwater fisheries in Niue. The Director of Niue's Department of Agriculture, Forestry and Fisheries (B. Pasisi, per. com. December 2008) indicates that neither tilapia nor *Macrobrachium* are caught in Niue.

Aquaculture Harvests

There is no aquaculture activity on Niue. Although there has been enthusiasm for culturing a number of species (trochus, giant clams, pearl oysters and freshwater prawns) in the past, these plans have not been realised.

Summary of Harvests

A crude approximation of the annual volumes and values[1] of the fishery and aquaculture harvests in 2014 can be made from the above sections (Table 12-2).

Table 12-2: Annual Fisheries and Aquaculture Harvest in Niue, 2014

Harvest Sector	Volume (mt)	Value (NZ$)
Coastal Commercial	11	148,500
Coastal Subsistence	154	1,455,300
Offshore Locally based	0	0
Offshore Foreign-based	547	1,944,943
Freshwater	0	0
Aquaculture	0	0
Total	**712**	**3,548,743**

1 The values in the table are dockside/farm gate prices.

Figures 12-1 and 12-2 show the volumes and values of the 2014 Niue fisheries production.

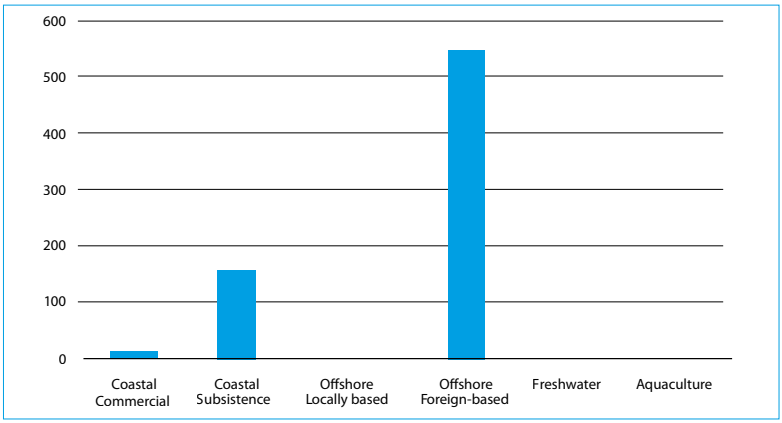


Figure 12-1: Niue Fisheries Production by Volume (mt), 2014

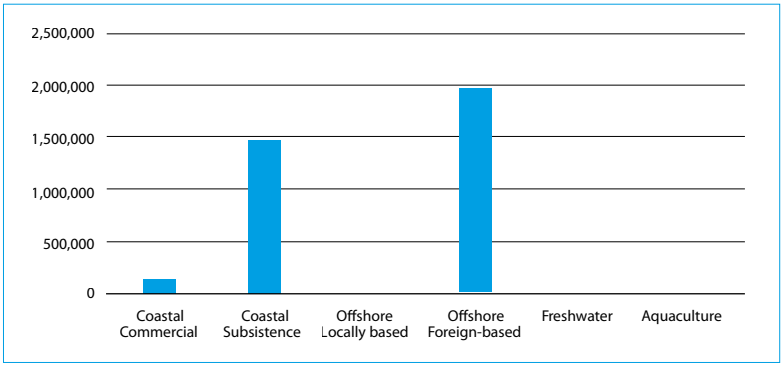


Figure 12-2: Niue Fisheries Production by Value (NZ$), 2014

Past Estimates of Fishery Production Levels by the Benefish Studies

Similar studies of the benefits to Pacific Island countries and territories from fisheries ("Benefish" studies) have been carried out in the past. Gillett and Lightfoot (2001) focused on the year 1999, Gillett (2009) focused on 2007 and the present study focuses on 2014. The fishery production levels for Niue from those three studies are presented in Table 12-3.[2]

2 The earliest Benefish Study, Gillett and Lightfoot (2001), did not include aquaculture, freshwater fisheries or the non-independent territories.

Table 12-3: Estimates by the Benefish Studies of Annual Fisheries/Aquaculture Harvests

Harvest Sector	Estimate Year	Volume (mt, and pcs where indicated)	Nominal Value (NZ$)
Coastal Commercial	1999	12	96,000
	2007	10	80,000
	2014	11	148,500
Coastal Subsistence	1999	194	315,640
	2007	140	840,000
	2014	154	1,455,300
Offshore Locally based	1999	0	0
	2007	640	2,508,000
	2014	0	0
Offshore Foreign-based	1999	2	8,000
	2007	0	0
	2014	547	1,944,943
Freshwater	1999	n/a	n/a
	2007	0	0
	2014	0	0
Aquaculture	1999	n/a	n/a
	2007	0	0
	2014	0	0

Source: The present study, Gillett (2009), Gillett and Lightfoot (2001)

The apparent changes in production for the three-year period represents a real change in production in some cases, but this can also represent a change in the methodology for measuring the production (hopefully an improvement). In the table above, the production levels for coastal commercial and coastal sometimes change significantly between the years, but some of that change is due to the way in which the production was estimated. For example, in 2002 a household income and expenditure survey (HIES) in Niue gave a different (and apparently better) estimate of coastal subsistence production. In contrast, changes in production figures in the table for the offshore fisheries (based on the availability of better quality data) are likely to reflect real changes in the amounts being harvested.

12.2 Contribution of Fishing to GDP

Current Official Contribution

The Niue GDP for recent years is given in Statistics and Immigration Division (2015). Unpublished data from the Statistics and Immigration Division gives the fishing components of the GDP. These are shown in Table 12-4. According to the Director General of Natural Resources, the category "private (fisheries)" is commercial fishing, and the category "Private and subsistence" is fishing by people for subsistence and occasional sales.

Table 12-4: The Fisheries Contribution to the Niue GDP (NZ$ thousands)

	2008	2009	2010	2011	2012	2013	2014
Private (fisheries)	86	106	115	118	121	122	125
Private and subsistence	839	1,032	1,117	1,152	1,180	1,188	1,212
Total fisheries	925	1,138	1,232	1,271	1,301	1,310	1,337
Niue GDP (current prices)	21,417	22,858	25,073	26,970	28,125	30,381	31,273
Fisheries as a % of GDP	4.3%	5.0%	4.9%	4.7%	4.6%	4.3%	4.3%

Source: Statistics and Immigration Division (2015), and Statistics and Immigration Division (unpublished data)

Method Used to Calculate the Official Fishing Contribution to GDP

The methodology used for calculating the components of the fisheries contribution to GDP is not readily available.

Alternative Estimate of Fishing Contribution to GDP

Table 12-5, below, represents an alternative to the official method of estimating fishing contribution to GDP in Niue. It is a simplistic production approach that takes the values of two types of fishing/aquaculture activities for which production values were determined in Section 12.1, above (summarised in Table 12-2), and determines the value added by using value added ratios (VARs) that are characteristic of the type of fishing concerned. Those VARs were determined through knowledge of the fisheries sector, and by using specialised studies (Appendix 3).

It is not intended that the approach in Table 12-5 replace the official methodology, but rather that the results obtained serve as a comparator to gain additional information about the appropriateness and accuracy of the official methodology, and to indicate any need for its modification.

Table 12-5: Fishing Contribution to GDP 2014 Using an Alternative Approach

Harvest Sector	Gross Value of Production (NZ$, from Table 12-2)	VAR	Value Added (NZ$)
Coastal Commercial	148,500	0.65	96,525
Coastal Subsistence	1,455,300	0.85	1,237,005
Offshore locally based	0	0.20	0
Freshwater	0	0	0
Aquaculture	0	0	0
Total (NZ$)	**1,603,800**	---	**1,333,530**

The above 2014 fishing contribution of NZ$1,333,530 represents 4.3% of the NZ$31,273,000 GDP of Niue. This is remarkably close to the official contribution of NZ$1,337,000, which is also (with rounding) 4.3% of the GDP.

12.3 Exports of Fishery Production

Since Niue Fish Processors and the associated longlining ceased activities in late 2007 there have been no formal exports of fishery products from Niue. Informal fish exports occur as passenger baggage on flights to Auckland, but these are not monitored.

If there were 75 flights in 2014 and each flight carried 100 kg of fish, this equates to an informal export of 7.5 mt of fish during the year. In 2014 the value of all exports was NZ$19,309,000 (http://wits.worldbank.org), so at NZ$15/kg this hypothetical fish export represented about 0.6% of all exports in 2014.

12.4 Government Revenue from Fisheries

Access Fees for Foreign Fishing

The Niue report presented in August 2015 to the Scientific Committee of the Western and Central Pacific Fisheries Commission (Fisheries Division 2015) states that, in 2014, eight vessels were licensed to fish in the Niue

zone. According to the Director General of Natural Resources, each vessel paid US$10,000 (a total of NZ$102,400 for eight vessels) to fish in the Niue zone (J. Tamate, per. com. November 2015).

Under the terms of the US multilateral tuna treaty, Niue and other Pacific Island countries receive payments from the US government and the US tuna industry, which are associated with fishing access by US purse seine vessels. Although US purse seiners have not attempted to fish in Niue in over 20 years, Niue still receives these payments. According to unpublished data from the US National Fisheries Service and from the Forum Fisheries Agency, in 2014 Niue received US$555,815 (NZ$711,443) for participation in the tuna treaty.

In 2014 the total access fees for the longlining and the US treaty were NZ$813,843. In the government budget this is split between two fiscal years. In "Estimates of Expenditure and Revenue for 2014/15" (Government of Niue 2015), the actual revenue was NZ$777,449 in fiscal year 2013/2014 and NZ$979,000 in fiscal year 2014/2015.

According to the Appropriations (Annual) Act 2014, the 2013/2014 actual "recurrent expenditure" was NZ$24,359,389. The NZ$813,843 paid for fishing access in 2014 (eight vessels plus the US tuna treaty) therefore represents 3.3% of the government's recurrent expenditure for Niue's budget year 2013/2014.

Other Government Revenue from Fisheries

No information is available on the amount of any such revenue in Niue.

12.5 Fisheries-Related Employment

The 2009 agriculture census of Niue (Statistics Niue 2010) contains fisheries participation information, as follows:

- Most household were engaged in inshore fishing (62%), 31% were involved in both inshore and offshore fishing, with the remaining 7% being involved in offshore fishing only. This showed that fishing in Niue is still more of a subsistence activity than commercial fishing.
- Household participation in fishing activity was very high across the country, with only one village (Lakepa) with less than a 50% participation rate. Toi had the highest participation rate (89%), where 8 out of 9 household were involved in fishing in the last 10 months.

- The main purpose of household fishing activity was for home consumption, accounting for 82% of fishing households, with 16% selling some of their catches, with the remaining 2% of fishing households fishing mainly for the purpose of sale.
- Of the 564 people who engaged in fishing in the week before the census night, 201 were females and 363 were males.

Employment was covered in the 2011 Niue census (Vaha, 2012). Unfortunately, this census information is not very useful for the fishing sector because it aggregates fishing jobs into a larger category: "Skilled agricultural forestry and fishery workers". The census listed 737 people in the labour force, of which 50 were "Skilled agricultural forestry and fishery workers".

To some degree in Niue, the change in the number of boats reflects the change in participation in fishing. A comparison of the number of vessels in the 2006 and 2011 censuses (Anon. 2007 and Vaha 2012) is given in Table 12-6. It can be seen in the table that, between 2006 and 2011, the population of small craft increased by 57 (26%), while the national census shows that the human population decreased by 14 people (0.9%).

Table 12-6: Change in the Number of Small Craft 2006–2011

	Canoe	Aluminium Dinghy	Inflatable Dinghy	Boat	Other	Total
2006	122	66	5	23	0	216
2011	142	115			16	273

Source: Anon. (2007) and Vaha (2012)

The SPC ProcFish survey in 2005 (Kronen et al. 2008) contained some useful employment information, as follows:

- There are estimated to be 597 fishers (346 males and 251 females). Of these, 170 persons fish only for finfish (155 males, 15 females), 75 only harvest invertebrates (13 males, 62 females), and 352 fish for both finfish and invertebrates (178 males, 174 females), although not necessarily during one single fishing trip.
- Niue's population does not depend on the primary sector for income generation, but rather on salaries and private business: salaries are the major source of revenue for 60% of households, while for 30% of all households private business is the main revenue source. Only 10% of all households surveyed reported that fisheries provide a complementary income (and another 18% gain a secondary income from selling agricultural produce).

Three reports provide information on gender aspects of Niue fishing:

- Tuara (2000) states that there is little to no information documenting the activities of women involved in fisheries in Niue. The report indicates that females are involved in a range of reef fishing activities. During the day, when the tide is low, females collect a range of invertebrates, including octopus, Turbo spp. snails, tube worms, sea urchins, clams, seaweed and other shellfish. Most of these are collected by hand, although metal implements are sometimes used to dislodge shellfish from the rocks. Females also use poles with a piece of monofilament line and a hook to fish for reef fish in rock pools at the reef edge.
- Vunisea (2005) states that women fish within the narrow reef areas, while men fish from canoes, dinghies and powered boats beyond the reef. Women's fishing activities involve gleaning for shellfish, collecting crabs and other seafood, and using rods and line to catch reef fish along the reef edges. Men mainly troll for pelagic fish, especially the migratory tuna species. The installation of fish aggregating devices has helped to extend men's fishing activities beyond the immediate reef areas.
- Kronen et al. (2008) provide information on the areas where men and women characteristically fish (Table12-7).

Table 12-7: Gender Aspects of Fishery Resources and Fishing Areas

Resource	Fishery	% Male fishers interviewed	% Female fishers interviewed
Finfish	Coastal reef slope	100	100
Invertebrates	Coastal reef flat	98.4	100
	Other	1.6	0

A Niue-based fisheries economist believes there are about 10 people who spend at least 50% of their time in fishing, and could be considered the core of commercial fishing in Niue (J. Tamate, per. com. December 2015). Those 10 people represent about 1.4% of Niue's 737 person work force.

12.6 Levels of Fishery Resource Consumption

Dalzell et al. (1993) estimated per capita fish consumption using a 1987 SPC nutrition study. It is estimated that annual per capita consumption is 40.8 kg food weight, or about 49.0 kg whole fish weight.

Gillett and Lightfoot (2001) considered: (i) the Niue population of 1,900 people in 2000; (ii) subsistence fisheries production of 194 mt; (iii) commercial fisheries production of 12 mt; and (iv) fishery imports of 20 mt. From this information they determine that the annual per capita consumption of fishery products on Niue in 2000 was about 118.9 kg.

SPC's ProcFish programme conducted fieldwork around Niue in May and June 2005. With respect to fish consumption, that survey interviewed about half of the households and made estimates of fish consumption (Table 12-8).

Table 12-8: Seafood Consumption on Niue, from SPC's ProcFish Survey

Item	Consumption (kg)
Quantity fresh fish consumed (kg/capita/year)	31.03 (±2.28)
Quantity fresh invertebrate consumed (kg/capita/year)	2.53 (±0.33)
Quantity canned fish consumed (kg/capita/year)	17.17 (±1.26)

Source: Kronen et al. (2008), and M. Kronen per. com. (March 2009)

The report of the Niue ProcFish survey (Kronen et al. 2008) reveals some interesting results concerning the nature, frequency and quantity of seafood consumption:

> Taking into account all households interviewed, the per capita consumption of fresh fish was found to be 31.1 kg/year on average. This figure is below the regional average estimated at 35 kg/ year and also lower than previous estimates, which range from 40.8 to 49 kg/year (Dalzell et al. 1993) to 118.9 kg/year (SPC 2000). However, it should be noted that the data we collected only cover the average household consumption and do not include finfish consumed at frequent feasts and celebrations, such as haircutting ceremonies, or in meals purchased from snacks and restaurants, which is likely to be a substantial amount. An estimation of this increment is made by adding pelagic and midwater catch data reported in the framework of the SPC project on FADs to our reef and canoe fishing data. Variation in finfish consumption among villages, however, is significant. Consumption ranges from 7.8 kg/year (Namakulu) to 49 kg/year (Alofi

North). Comparing the geographic location of villages where fresh fish consumption is high, such as Avatele, Tamakautoga and Alofi, with those where consumption is much lower, higher consumption appears to coincide with easier access to less exposed fishing grounds. The average per capita canned fish consumption of 18.2 kg/year is relatively high but not surprising given the high dependency on imported goods and the fact that fish constitutes a traditional and integral component of the Niuean diet.

The results of the ProcFish study, in respect of commercial fishing, are described in the present chapter, above. The following further observations may be made: (a) the survey data suggests a total annual reef finfish catch of 53.4 mt; (b) there is an estimated production of 76.2 t/year from mid-water and trolling fishing; (c) applying sample data to the total number of possible invertebrate fishers in Niue, the total annual impact in biomass (wet weight) removed amounts to 35.3 t/year. This equates to a total annual harvest of 164.9 mt in 2005. Subtracting the informal exports of fish (7.5 mt per year from the export section above) gives 157.4 mt. With Niue's 2005 population of 1,660, that equates to 94.8 kg per capita. Adding 17.2 kg of canned fish, from the table above, results in 2005 annual per capita fish consumption in Niue of 112.0 kg.

Bell et al. (2009) use information from household income and expenditure surveys conducted between 2001 and 2006 to estimate patterns of fish consumption in Pacific Island countries. The HIES were designed to enumerate consumption based on both subsistence and cash acquisitions. For Niue the annual per capita fish consumption (whole weight equivalent) was 79.3 kg, some of which was imported.

In the present survey production from coastal commercial and subsistence fisheries is estimated to have been 165 mt in 2014. The population of Niue was 1,499 in 2014 (SPC's PRISM website data). That equates to 110 kg per capita per year, without considering informal fish exports and canned fish imports.

12.7 Exchange Rates

Niue uses the New Zealand dollar (NZ$). The average yearly exchange rates (NZ$ to the US dollar) used in this book are as follows:

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1.51	1.42	1.54	1.36	1.32	1.39	1.30	1.29	1.21	1.22	1.28