

9 Kiribati



9.1 Volumes and Values of Fish Harvests in Kiribati

Coastal Commercial Catches in Kiribati

The following are the major historical attempts to consolidate information on coastal fisheries production in Kiribati in recent years:

- Dalzell et al. (1996), using data from a 1991 nutritional survey, estimated coastal commercial fisheries production of 3,240 mt (worth US\$4.8 million) and subsistence fisheries production of 9,084 mt (worth US\$13.4 million).
- Gillett and Lightfoot (2001) considered the Dalzell estimate, studies by the Fisheries Division and other agencies, and the opinions of fisheries specialists with substantial experience in Kiribati. They subsequently ventured an estimate of coastal commercial fisheries production of

6,000 mt (worth US\$9.8 million), and subsistence fisheries production of 10,000 mt (worth US\$12.2 million).

- Recent annual reports of the Fisheries Division (2003–2006) contain much valuable information, but it appears that the only attempt to consolidate fisheries production information is in the 2003 Fisheries Division Annual Report. That report states: “The weekly fish production for all Islands in the Gilbert group is 489.5 tonnes per week. This shows a decrease of 38% from last year’s figure of 791.7 tonnes per week.” (Fisheries Division 2004).
- Preston (2008) partitions coastal fisheries production into two components: household fishery catch and export fishery catch. An annual household fishery catch of 20,000 mt is estimated. For export fish production, because the available statistics are often incomplete and inconsistent, Preston does not make an overall estimate, but rather just presents the available data.
- Gillett (2009): (a) uses the Preston (2008) figures, (b) estimates fisheries production for export, and (c) considers the results of a short, small-scale tuna fishing survey on South Tarawa. Overall, Gillett (2009) estimated that, in the mid-2000s, coastal commercial production was about 7,400 mt (worth about A\$22 million [Australian dollars] to fishers), and subsistence production was about 13,700 mt (worth about A\$34 million to fishers).

As much of the information used in making the above estimates of coastal fisheries production is still relevant today, some of the important older studies and data are presented in the following paragraphs. This is followed by commentary on a recent study, some recent developments affecting coastal fisheries production, and, finally, an updated estimated of coastal fisheries production.

A household income and expenditure survey was carried out in Kiribati in 2006. Unpublished data on this HIES, kindly supplied by SPC’s Statistics and Demography Programme, shows that, in Kiribati in 2006, about 2,000 mt of fish was purchased for A\$5.9 million, and 3,371 mt of fish, valued at A\$8.4 million, was caught for subsistence purposes. Preston (2008) considered those estimates to be low, and did not use the results in his estimate.

A study commissioned by SPC included a short survey of one of the most important fisheries of the country, trolling for tuna in South Tarawa (Sullivan

and Ram-Bidesi, 2008¹). The results of that work show that the following:

- In mid-2008, 126 active full-time commercial tuna troll fishing craft operated out of South Tarawa, and 88 tuna troll fishing craft also participated on a sporadic basis.
- About 6,300 kg of tuna and related pelagic species were sold per day, on average – or 126 mt per month. To these commercial sales, approximately 5% should be added for domestic consumption, giving total landings of tuna of about 132 mt per month, or 1,584 mt per year.
- The market price of tuna was A\$2.65/kg. Tuna sales accounted for about A\$334,000 per month, or A\$4 million per year.

Discussions with the Director of Fisheries in 2008 indicated that about 60% to 70% of coastal fisheries production in Kiribati is for subsistence purposes. The commercial component has expanded in recent years, due to increasing ice production in outer islands. Many islands now have cold storage (14 of 33 islands in Kiribati), enabling storage for local sale and shipment to Tarawa. (R. Awira, per .com. October 2008).

An IUCN study that has considerable relevance to valuing coastal fisheries in Kiribati was recently carried out under the MACBIO Programme, which is described in Box 9-1.

Box 9-1 : Economic Assessment and Valuation of Marine Ecosystem Services

This study aimed to determine an *economic value* of seven marine and coastal *ecosystem services* in Kiribati. It is part of the MACBIO (Marine and Coastal Biodiversity Management in Pacific Island Countries) project, which aims to improve the management of marine and coastal biodiversity in Pacific Island countries. The MACBIO project has undertaken national-level economic assessments of marine and coastal ecosystems in the five project countries. The work aimed to contribute to national development plans and marine resource management policies and decision-making. The report quantifies the value of seven marine and coastal ecosystem services in Kiribati: subsistence food provision; commercial food harvesting; mineral and aggregate mining; tourism; carbon sequestration; coastal protection; and research, management and education.

Two sources of data were used to estimate the value of subsistence fishing in Kiribati: Ministry of Fisheries data and the 2006 Household Income and Expenditure Survey (HIES). The economic value of subsistence fishing estimated using these two sources differed significantly, probably because the scope, coverage and timing of the data sources are different.

Source: Rouatu et al. (2015)

¹ The tuna trolling survey was carried out by Mike Savins, a fisheries specialist and long-time resident of Tarawa.

A description of the coastal fisheries results is provided in Table 9-1, below.

Table 9-1: The MACBIO Results Relevant to Kiribati Coastal Fisheries

Activity	Beneficiaries	Net annual value (A\$) (2013 adjusted)	Sustainability
Subsistence fishing	I-Kiribati households, particularly outer islands. Value represents range from different data sources	9–34.5 m	Abundant resources in outer islands with small populations; much overfishing in South Tarawa
Small-scale fishing for sale	I-Kiribati fishers and consumers, some restaurants and businesses (only value to fishers is estimated); logistical obstacles on outer islands, but some cold storage and transport investments are being made. Value range represents different sources	2.8–10 m	Over-exploited resources near South Tarawa; transport and storage obstacles may reduce pressure on outer islands. Much waste due to lack of refrigeration
Bêche-de-mer, aquarium trade, and mariculture	Very small industries with small number of beneficiaries, but important to some people	< 1 m	Unknown
Seaweed Mariculture	Many households on Kiritimati and Tabuaeran	Insufficient data	Unknown

Source: Rouatu et al. (2015)

The MACBIO results can be compared to those of the Gillett study (Table 9-2).

Table 9-2: Comparison of Annual Values for Fisheries Sub-Sectors in two Studies

	Gillett (2009) (for 2007)		MACBIO (uses data from 2006 to 2013)	
	Gross Value of Production (A\$)	Value Added	Gross Value of Production (A\$)	Value Added (A\$)
Coastal Commercial	22,000,000	14,300,000	7 to 25 million	2.8 to 10 million
Coastal Subsistence	34,000,000	30,600,000	Between 10 and 38.5 million	9 to 34.5 million
Aquaculture	90,000	64,800	Insufficient data	Unknown
Total	56,090,000	44,964,800		

In general, the MACBIO fisheries production values are much less than those in the Gillett (2009) study.

The MACBIO results were based, to some degree, on per capita finfish consumption figures. The values used seem low. The report states: “The per capita consumption using a weighted average based on the island population is 74 kg. The total population of Kiribati was 103,058 in 2010 (KNSO 2012). Using that figure, 7.63 million kg (or 7,626 tonnes) of finfish are consumed per year by the people of Kiribati”. Gillett (2009) examines a range of estimates for annual per capita fish consumption in Kiribati over many years, and concludes that most estimates fall into the range of 72 to 207 kg/person/year. In SPC’s ProcFish surveys the average annual per capita consumption of finfish on four islands in Kiribati during 2004 was 106.9 kg, and 2.57 kg for invertebrates. The MACBIO fish consumption figures were extrapolated from data from unpublished Fisheries Department surveys in the period 2011 to 2013 at Aranuka, Butaritari, Nikunau, Tamana and Beru. The present survey considered a different set of unpublished data covering the same five islands, during the same period (K. Ientumoa, per. com. December 2015); the fish consumption figures on four of the five islands were much higher. Some other aspects of the MACBIO methodology, which indicate its unreliability, follow:

- There is some degree of dependence on the fisheries results of the 2006 HIES, but at least two fisheries studies examined the HIES and did not use the results. Even the MACBIO study stated: “There is very good information in the HIES. However, given the time constraints of the HIES, it is likely that the true value of subsistence fishing in the country is underestimated.”
- An explicit assumption in the MACBIO study was that “50% of finfish consumption comes from self-caught finfish”. The stated basis for this assumption is as follows: “An estimate of the amount of seafood purchased versus caught could not be located for Kiribati, but Bell et al. (2009) estimated for rural households in Fiji that 52% of seafood consumption came from subsistence.”
- An unstated assumption in the MACBIO methodology is that the Fisheries Department’s methodology used to determine fish catches on the five islands is sound and appropriately applied, and that data analysis was correct. Preston (2008) expresses some doubt about the veracity of the analysis.

From the above observations, there does not appear to be sufficient justification to embrace the MACBIO estimates of coastal fisheries production. The approach taken in the present study is to modify the Gillett (2009) results according to recent developments and factors that would affect coastal fisheries production.

The 2005 and 2010 census can be used to obtain an indication of changes in fishing effort in the five-year intervening period. Table 9-3 compares the number of boat-owning families between the two years. From the table it can be seen that, overall the number of boat-owning families increased by 90%, but South Tarawa experienced a fall in the number of such families.

Table 9-3: Change in number of Boat-Owning Households

	2005 - number of households owning at least one boat	2010 - number of households owning at least one boat	Change 2005 to 2010
All Islands	1280	2435	90%
Banaba	5	19	280%
Makin	18	91	406%
Butaritari	22	187	750%
Marakei	28	138	393%
Abaiang	51	225	341%
NTarawa	58	90	55%
STarawa	743	290	-61%
Maiana	14	48	243%
Abemama	52	68	31%
Kuria	10	16	60%
Aranuka	13	70	438%
Nonouti	29	94	224%
NTabiteuea	40	99	148%
STabiteuea	12	44	267%
Beru	13	178	1269%
Nikunau	12	163	1258%
Onotoa	18	171	850%
Tamana	5	98	1860%
Arorae	4	122	2950%
Teeraina	6	19	217%
Tabuaeran	38	99	161%
Kiritimati	86	106	23%
Kanton	3	0	-100%

Source: NSO (2006), NSO (2012)

Other changes affecting coastal fisheries in Kiribati over the last few years include the following:

- There has been a noticeable decrease in the fisheries production of Tarawa Lagoon, with a stark example being the ark shell (*Anadara* sp., “te bun”). Campbell and Hanich (2014) report that, in the early 1990s, when harvestable quantities were high, commercial harvesters collected about 1,000 mt of clams annually around Tarawa. However, over-exploitation of the resource from both commercial and subsistence harvesting has led to collection levels of less than one-tenth of their former size, as well as speculation that the fishery has almost collapsed.
- There has been a decrease in the production of tuna and other pelagic species from trolling from small boats based in South Tarawa. One reason for this could be that the reject fish from tuna transshipment operations in Tarawa Lagoon has driven a number of tuna trollers out of business. (M.Savins, per. com. October 2015). Unpublished data from Central Pacific Producers (CPP) shows that 373.9 mt of reject fish were sold to the public in 2014.
- Several fisheries studies have shown a decrease in the abundance of important fisheries resources, such as: Purcel et al. (2012) for beche-de-mer, Basabe (2012) and MFMRD (2013) for aquarium fish on Christmas Island, and Siosi (2012) for finfish on Abemama Atoll.
- The trend of increasing commercialisation of Kiribati coastal fisheries production, as noted in Gillett (2009), continues. An increasing number of islands have refrigeration-enabling storage for local sale and shipment to Tarawa. (M. Kamatie, per. com. October 2015).
- There has been some mention of the purchase of reef fish from outer islands for frozen export to mainland China. While this could be having a positive temporary impact on local livelihoods, this may jeopardise long-term future food security (M. Blanc, per. com. October 2015).
- According to SPC’s PRISM website data, the population of Kiribati has increased 14.1% between 2007 (the focal year for the Gillett [2009] study) and 2014 (the focal year for the present study). The long-term trend of rural to urban (South Tarawa) migration has eased.

The total production from Kiribati coastal fisheries are the catches for local consumption plus those catches that are exported. Gillett (2009) made a crude estimate of the export production from Kiribati coastal commercial

fisheries in 2006: 1,142 mt (plus 144,000 pet fish), worth A\$1.9 million. For 2014 it is more difficult to determine coastal fishery exports. Unlike the situation in 2006, in 2014 there was export of tuna, which is not separated in the export statistics from coastal fish, so it is not known how the 965 mt of “fish” exported in 2014 in the official export statistics is partitioned between coastal and offshore. The 2014 export data lacks information on pet fish and the information on the export of seaweed is very different from the amount given by the exporters.

The outer islands’ 2014 buying prices for fish was obtained from CPP (T. Kaureata, per. com. October 2015). Finfish averaged A\$1.65 to A\$1.70, with invertebrate prices ranging from A\$1.70 per kg (octopus) to A\$13.50 (prawn). In Tarawa the skipjack and reef fish price was about A3.30/kg in 2014 (M. Savins, per. com. October 2015).²

The information in this section (and in general, the existing data on coastal fisheries in Kiribati) is entirely inadequate for making even a crude approximation of annual production. From the available information it is likely that, in recent years, the coastal fisheries of the country have become increasingly commercialised, the coastal fisheries production in Tarawa has dropped, and an increasing proportion of fish for consumption by Tarawa residents is from commercial fishing in the outer islands and from transshipment operations.

Using this information (and 2014 fish price information) to adjust the coastal fishery production in the Gillett (2009) study carries many difficulties. Nevertheless, carrying out such an exercise results in a 2014 total coastal fishery production of 19,000 mt, worth A\$38,697,000 to fishers. This is comprised of:

- coastal commercial fishery production: 7,600 mt, worth A\$18,861,000; and
- coastal subsistence fishery production: 11,400 mt, worth A\$19,836,000.³

Coastal Subsistence Catches

Following the approach above, it is estimated that the production from coastal subsistence fisheries in Kiribati in 2014 was 11,400 mt, worth A\$19,836,000 to fishers.

² Prices used in the Gillett (2009) survey (A\$2.96 commercial, A\$2.50 subsistence) came from the 2006 HIES.

³ This is less than the Gillett (2009) study, primarily because of the buying prices of fish, with the 2014 prices considered to be more realistic.

Locally Based Offshore Catches

Although there are several Kiribati-flagged purse seiners and longliners, these are not based in Kiribati. Kiribati Fish Ltd. (KFL) has had longliners feeding fish into its Betio operation since 2012. It is difficult to determine the volumes and values of the catch of those longliners because the company has been unwilling to provide data to the present study, and their exports are combined with coastal fisheries exports in the official export statistics. In this situation, the most appropriate way to make an estimate of the volumes and values of locally based offshore catches is to rely on the observations of another Tarawa-based fish exporter. It is estimated that, in 2014, KFL exported 180 mt of loins by low temperature seafreight and 24 mt of high value loins by airfreight (M. Savins, per. com. November 2015). The pre-processing volume of that catch is estimated to be about 510 mt, with a value to fishers of about A\$4.4 million.

Foreign-Based Offshore Catches

To use the data available to the present study to estimate foreign-based catches in the Kiribati zone requires the assumption that all of the catches by Kiribati-based longliners (given above) are made in the Kiribati zone. The foreign-based offshore catches can be calculated by using tuna catches and prices in FFA (2015) in conjunction with the catches of Kiribati-based offshore fishing from the above section. The values given in table 9-4 are adjusted to be in-zone values (i.e. overseas market prices less transport charges to those markets).

Table 9-4: Volumes and Value of Offshore Catches in the Kiribati Zone

	2010	2011	2012	2013	2014
Purse seine volume (mt)	211,693	197,318	534,308	282,466	679,294
Frozen longline volume adjusted for bycatch (mt)	5,054	8,685	10,055	3,676	15,741
Fresh longline volume adjusted for bycatch (mt)	3,806	6,323	8,492	4,714	6,033
Frozen longline value adjusted for bycatch and transport (US\$)	22,741,807	39,083,709	45,245,745	16,544,008	70,832,509
Fresh longline value adjusted for bycatch and transport (US\$)	25,691,729	42,680,700	57,322,386	31,817,651	40,719,375
Purse seine value adjusted for transport (US\$)	311,497,379	290,344,882	786,212,315	415,637,492	999,554,575
Total volume all gears (mt)	220,553	212,326	552,854	290,856	701,068
Total value all gears (US\$)	359,930,916	372,109,291	888,780,447	463,999,151	1,111,106,458

Source: FFA (2015)

From the table it can be seen that, in 2014, the offshore catch was 701,067 mt, with an in-zone value of US\$1,111,106,458 (A\$1,355,549,878).

Freshwater Catches

There are no freshwater fisheries in Kiribati.

Aquaculture Harvests

In the past there have been attempts to culture a wide variety of aquatic species in Kiribati, including seaweed, brine shrimp, cockles, mojarra, mullet, pearl oyster, tilapia and giant clams (Uwate, et al. 1984). Currently, the only significant aquaculture production is milkfish, seaweed and giant clams.

Milkfish on Tarawa

According to staff of the Ministry of Fisheries and Marine Resources Development (MFMRD) the production is between 100 and 200 fish per week, with the majority of buyers being Kiribati residents departing for overseas (M. Kamatie, per. com. October 2015). With a selling price of A\$4/kg at the farm, the annual production is estimated to be 2.6 mt, worth A\$10,400 at the farm gate. The Taiwan technical mission to Kiribati, “Ambo fish farm”, has developed successful hatchery techniques for production of commercial quantities of milkfish fry for stocking outer island ponds and also, more recently, for exports to Nauru.

Milkfish on Christmas Island

The Kiritimati Integrated Fisheries Master Plan (MFMRD 2013) states that milkfish farming in Kiritimati Island has an average annual production of 15 mt, worth around A\$40,000.

Giant clams

The sole producer of cultured giant clams in Kiribati exported 8,642 clams in 2014, at a free-on-board (FOB) price of about A\$8.50 per clam (A\$73,457 total). All clam exports in 2015 have been sold to Majuro Clam Farm and Kosrae Clam Farm. (M. Savins, per. com. October 2015).

Seaweed

The height of seaweed farming in Kiribati was in 2000, when about 1,500 mt worth A\$900,000 was produced. In 2014 237 mt of seaweed worth was exported (NSO statistics). At the CCP Ltd buying price of A\$0.70/kg (T. Kaureata, per. com. October 2015), the value to farmers was A\$165,900.

The total Kiribati 2014 aquaculture production is estimated to be 255 mt, plus 8,642 pieces, worth A\$289,757 to fishers/farmers.

Summary of Harvests

A crude approximation of the annual volumes and values⁴ of the fishery and aquaculture harvests in 2014 can be made from the above sections (Table 9-5).

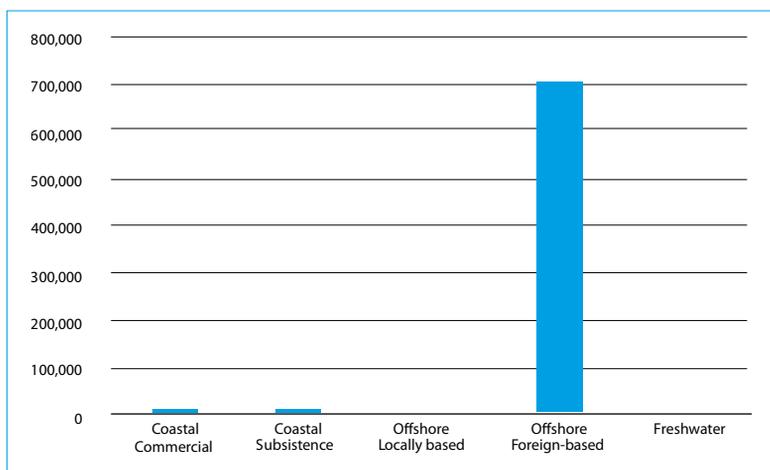
⁴ The values in the table are dockside/farm gate prices, except in the case of offshore, foreign-based fishing, where the value in local waters (overseas market prices less imputed transshipment costs) is given.

Table 9-5: Annual Fisheries and Aquaculture Harvest in Kiribati, 2014

Harvest Sector	Volume (mt, and pcs where indicated)	Value (A\$)
Coastal Commercial	7,600	18,861,000
Coastal Subsistence	11,400	19,836,000
Offshore Locally based	510	4,400,000
Offshore Foreign-based	701,067	1,355,549,878
Freshwater	0	0
Aquaculture (pcs and mt)	255 mt and 8,642 pcs	289,757
Total	720,832 mt and 8,642 pcs	1,398,936,635

The fairly weak factual basis for the estimates of coastal commercial and coastal subsistence catches should be recognised.

Figures 9-1 and 9-2 show the volumes and values of the 2014 Kiribati fisheries production. Aquaculture is not shown in the volumes figure, due to the use of mixed units (pieces and mt).

**Figure 9-1 : Kiribati Fisheries Production by Volume (mt), 2014**

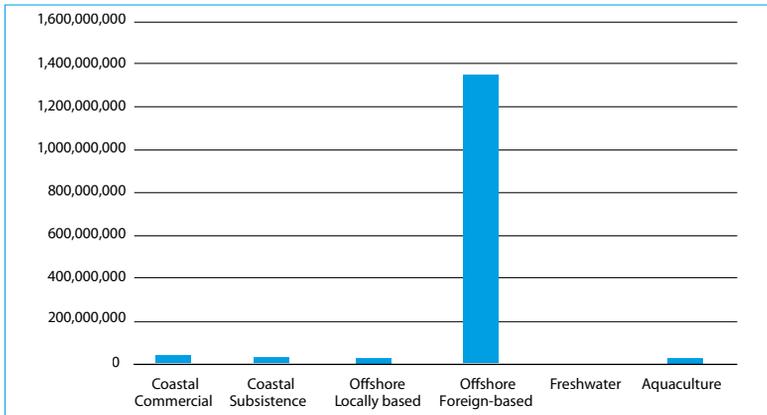


Figure 9-2 : Kiribati Fisheries Production 2014 by Value (US\$)

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 the Kiribati from those three studies are presented in Table 9-6.⁵

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, coastal subsistence and freshwater change significantly between the years, but some of that change is due to the way in which the production was estimated. In contrast, changes in production figures in the table for the offshore fisheries and aquaculture (based on the availability of better quality data) are likely to reflect real changes in the amounts being harvested.

⁵ The earliest Benefish Study, Gillett and Lightfoot (2001), did not include aquaculture, freshwater fisheries or the non-independent territories.

Table 9-6: Estimates by the Benefish Studies of Annual Fisheries/Aquaculture Harvests

Harvest Sector	Estimate Year	Volume (mt, and pcs where indicated)	Nominal Value (A\$)
Coastal Commercial	1999	6,000	9,780,000
	2007	7,000	22,000,000
	2014	7,600	18,861,000
Coastal Subsistence	1999	10,000	12,230,000
	2007	13,700	34,000,000
	2014	11,400	19,836,000
Offshore Locally based	1999	0	0
	2007	0	0
	2014	510	4,400,000
Offshore Foreign-based	1999	132,000	205,000,000
	2007	163,215	234,491,135
	2014	701,067	1,355,549,878
Freshwater	1999	n/a	n/a
	2007	0	0
	2014	0	0
Aquaculture	1999	n/a	n/a
	2007	143 mt and 100 pcs	90,000
	2014	255 mt and 8,642 pcs	289,757

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

9.2 Contribution of Fishing to GDP

Current Official Contribution

The official contribution of fishing to GDP is given in Table 9-7.

Table 9-7: Fishing Contribution to GDP (A\$ thousands)

	2012	2013r	2014p
Central Pacific Producers (CPP)	284	740	2,212
Informal sector fishing for cash sales	5,047	5,157	5,270
Informal sector fishing for subsistence	8,413	8,596	8,783
Seaweed growers	282	285	287
Total fishing & seaweed	14,026	14,778	16,553
Total Kiribati GDP	180,510	182,467	192,851
Fishing/seaweed as a % of GDP	7.8%	8.1%	8.6%

r = revised, p = provisional
Source: NSO (unpublished data)

Method Used to Calculate the Official Fishing Contribution to GDP

The notes accompanying the NSO GDP estimates contain some information on methodology, as follows:

- Information on informal fishing is from the 2006 HIES, which is corrected for future years by change in population and price of fish. From 2008 to 2014 the price used for fish remained at A\$3.08/kg.
- CPP data is from company accounts.
- It is recognised that, under international convention (i.e. System of National Accounts, SNA), CPP is outside the fishing sector as it does not fish, but rather carries out processing and has retail sales.
- The official GDP does not consider non-seaweed aquaculture (i.e. giant clams and milkfish).

An information paper on the national accounts of Kiribati (NSO 2011) provides additional information on the methodology for calculating the fishing contribution to GDP, as follows:

Many people in Kiribati fish for their own consumption and some fish for cash or for commercial purposes. There are also people who fish for both—for cash and for own consumption. Now to find these people or their total production, let alone differentiate their own consumption from their commercial activity, is very very difficult. Many of these do not need registration fees or licenses to operate—they just go out fishing on their boats or canoes anytime of the day, and if they catch a large number of fish they can either sell all of them or retain some for their own use. Now setting up the production account for this kind of activity is very difficult because there are no proper records of the catch and the sales. One way of obtaining information on these activities is to conduct a household income and expenditure survey but this is a fairly expensive exercise and in Kiribati only two household surveys have been conducted, one in 1996, and the second one in 2006. In other words, there is very little information on the informal commercial fishing in Kiribati. Although some estimates have been made based on the 2006 HIES, one should be very cautious when interpreting the trend and growth rates. This is basically because data for the other years are simply estimated by extrapolating the benchmark figures by the population estimates and price movements. Obviously more work is needed in this area.

Alternative Estimate of Fishing Contribution to GDP

Table 9-8, below, represents an alternative to the official method of estimating fishing contribution to GDP in Kiribati. It is a simplistic production approach that takes the values of five types of fishing/aquaculture activities for which production values were determined in Section 9.1, above (summarised in Table 9-5), 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 9-8, below, 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 9-8: Fishing Contribution to GDP in 2014, Using an Alternative Approach

Harvest Sector	Gross Value of Production (A\$, from Table 9-5)	VAR	Value Added (A\$)
Coastal Commercial	18,861,000	0.65	12,259,650
Coastal Subsistence	19,836,000	0.90	17,852,400
Offshore Locally based	4,400,000	0.20	880,000
Freshwater	0	0	0
Aquaculture	289,757	0.72	208,625
Total	43,386,757	----	31,200,675

The fishing contribution to GDP – A\$31.2 million – is 16.2% of the A\$192.9 million GDP of Kiribati in 2014.

The 2014 fishing contribution to GDP, in Table 9-8 (A\$31.2 million), is considerably greater than the official fishing contribution to GDP of A\$16.6 million, given in Table 9-7. The official contribution is much lower mainly because the “Informal sector fishing for cash sales” and “Informal sector fishing for subsistence” are about half of the corresponding amounts in the alternative approach. It also needs to be considered that the official approach does not include the contributions of offshore locally based fishing and aquaculture, other than seaweed. Conversely, the output of CPP (which does not carry out fishing, and is therefore not a part of the fishing sector) is considered as part of the official fishing contribution.

9.3 Exports of Fishery Production

The official exports of Kiribati, kindly provided by the NSO, are given in Table 9-9.

Table 9-9: Value of Fishery Product Exports (A\$ thousands)

	2009	2010	2011	2012	2013	2014
Fish				44	263	3025
Pet fish	926				70	
Sharkfins	462	143	210	78	2	28
Seaweed	360	47	428		212	256
Beche-de-mer	1536	731	539	765	287	54
All above fishery exports	3284	921	1177	887	834	3363
All exports	5970	2899	7144	4876	4182	8426
Fishery exports as a % of all exports	55.0%	31.8%	16.5%	18.2%	19.9%	39.9%

Source: NSO (unpublished data)

The above table is incomplete, in that it does not contain pet fish exports in 2014, and also appears to be inaccurate. The A\$3.0 million given for the exports of “fish” consists of both coastal fish exports and the exports from locally based offshore vessels. For the latter, an earlier section of this chapter gives the pre-processing value of those fish as A\$4.4 million, with the FOB price much greater; accordingly, the value of “fish” for 2014 in the above table is too low. In addition, the A\$73,457 of giant clam exports in 2014 given in the aquaculture section above is not listed in the table.

9.4 Government Revenue from Fisheries

Access Fees for Foreign Fishing

The Ministry of Finance and Economic Development Annual Report 2014 (MFED 2015) states:

The total recurrent revenue collected in 2014 was \$187.84 million. This is \$109.08 million over the total revenue budget estimate of \$78.76 million. The significant increase in revenue is due to fishing licenses which rose to \$141.57 million. Total revenue from fishing license fees exceeded its budget by \$103.57 million and reflected the move to the Vessel Day Scheme which has had a significant impact on fishing revenue. Total revenue from all fishing sources was \$142.68 million. The taxation base is very low and therefore revenue raised through personal income taxes and company taxes are

also low. Non-compliance with regard to company taxes has been a continuing problem which leads to less than adequate government taxation revenue. Fisheries license fees are the major source of revenue with 75% of total government revenue from that source in 2014.

The Ministry of Finance and Economic Development Annual Report 2014 (MFED 2015) also contains the following statement:

As a result of the economic reforms and reforms to state owned enterprises, for the first time, Budget Support of \$10.4 million was provided by the World Bank, New Zealand and the ADB. The support was based on the Government of Kiribati meeting agreed targets in the economic reform program including... A joint report on sources of fisheries revenue produced by the Ministry of Fisheries and Marine Resource Development and MFED. This report is available on the MFED website.

That report, "Fishing License Revenues in Kiribati", contains the statement: "The review has been undertaken to ensure that the revenue benefits to the Government of Kiribati from the issuance of fishing licenses have been maximized." (MFED & MFMRD, 2014). The report contains the access fees for 2004 to 2013 (Table 9-10).

Table 9-10: Access Fees for Foreign Fishing

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Nominal A\$ millions	29.4	25.0	25.8	25.4	31.2	29.5	41.7	29.1	58.3	89.0
Nominal US\$ millions	21.7	19.0	19.4	21.3	26.7	23.4	38.4	30.1	60.4	86.1

Source: MFED and MFMRD (2014)

Other Government Revenue from Fisheries

Unpublished data from the Ministry of Finance and Economic Development shows all fisheries-related revenue in 2014 (Table 9-11).

Table 9-11: Fisheries Revenue in 2014 (A\$)

Account Code	Account Name	Revenue
C21030000010	Vessel and Equipment Hire	3,254.50
C21030000040	Fish and fish poster sales	30,680.25
C21030000041	Local Fishing	69,377.85
C21030000042	Local Licencing	41,611.40
C21030000043	Fish transshipment fees	963,591.07
C21030000045	Fishing License Revenue	141,573,749.90
	Grand Total	142,682,264.97

Source: MFED (unpublished data)

It can be seen that, in 2014, the fees for fish transshipment were the second-most important source of fisheries revenue for the government. The large amount of transshipment during that year (as well as the large amount of access fees) was due to the El Niño conditions that prevailed during 2014. SPC unpublished data shows that, from logsheet data, 297 purse seine fishing trips had Tarawa as the port of return, which usually means that a transshipment occurred. Purse seine transshipment fees have recently increased, from US\$6 to US\$40 per mt (B. Onorio, per. com. October 2015), resulting in many purse seiners transshipping in ports outside Kiribati (along with efforts by the Kiribati government to encourage them to return). The Kiribati government has the policy that during purse seine transshipment operations all rejected fish must be given to the government-owned Central Pacific Producers. Unpublished CPP data shows that, in 2014, 373.9 mt of rejected fish was sold by CPP to the public, for A\$448,716.

9.5 Fisheries-Related Employment

The Kiribati 2010 Census of Population and Housing (NSO 2012) contains some fisheries-related employment information. Table 9-12 (extracted from a large table in the census report) provides the major categories of fisheries jobs, broken down by the age and sex of the workers.

Table 9-12: Fisheries-Related Employment Information by Sex, Age, and Occupation

Age (years)→ Job category ↓	Total	Both sexes				Male				Female			
	All	15-24	25-34	35-49	50+	15-24	25-34	35-49	50+	15-24	25-34	35-49	50+
Fishing guides	14	3	4	4	3	3	4	4	3	0	0	0	0
Seaweed farmers	126	38	27	44	17	22	18	29	11	16	9	15	6
Coastal fisherman	2730	751	749	845	385	707	715	787	362	44	34	58	23
Other fisheries workers (Kereboki etc.)	152	37	49	43	23	31	39	27	12	6	10	16	11
Deepsea fisherman	122	30	34	45	13	29	32	42	12	1	2	3	1
Other fisheries workers	7	2	5	0	0	1	4	0	0	1	1	0	0
Fishery assistants	27	5	9	11	2	5	6	6	2	0	3	5	0
Total	3178	866	877	992	443	798	818	895	402	68	59	97	41

Source: 2010 census

The data in the table appears to underestimate the numbers of workers in some types of jobs. The “deepsea fisherman” category serves as an example. “Deepsea fisherman” is not defined in the census report, but if it refers to fishing in the open ocean from skiffs, the 2008 South Tarawa survey described in the coastal fisheries section above (Sullivan and Ram-Bidesi 2008) shows that more than three times the number of people fish in the open ocean than that indicated in the 2010 census (i.e. 126 active full-time commercial tuna troll fishing craft, plus 88 part-time). If “deepsea fisherman” refers to people who work on offshore fishing vessels, there are at least twice that number working on just the Japanese pole-and-line fleet. (Gillett 2015).

The usefulness of the 2010 census for fisheries purposes is constrained, to some extent, by the use of an aggregated category. The census reports some results in the grouping “skilled agriculture and fisheries workers”, making it difficult to identify the number of people in fisheries-related employment.

A change in the level of boat ownership could, to some extent, reflect a change in fisheries participation. Table 9-3, in the Kiribati coastal fishing section, above, indicates the changes, between 2005 and 2010, in the number households that own a boat. Overall, the number of boat-owning families increased by 90% in that period. A decline was recorded only for South Tarawa and Kanton. The number of households that owned boats increased on all other islands, with six islands recording an ownership increase of more than 500% (Butaritari, Onotoa, Nikunau, Beru, Tamana and Arorae).

SPC’s ProcFish programme surveyed four sites in Kiribati (Awira et al. 2008). Table 9-13 is an extract from the report of the survey showing the importance of both reef fisheries and the sale of fish.

Table 9-13: Involvement with Fisheries at the ProcFish Sites

	Households involved in reef fisheries	Households with fisheries as the most important source of income
Abaiang	100%	56%
Abemama	96%	24%
Kuria	91%	17%
Kiritimati	92%	36%
Average across the 4 sites	95%	34%

Source: Awira et al. (2008)

SPC (2013) uses ProcFish data to examine the ratio of men to women fishers across the Pacific. For the Kiribati sites examined, about 65% of fishers are men and 35% are women.

The Forum Fisheries Agency has a programme – Economic Indicators Project – that collects data on tuna-related employment in standard format. FFA (2015) contains information on the employment of people from Kiribati in the tuna industry (Table 9-14). A total of 795 I-Kiribati were employed in the tuna industry in 2014. Across the Pacific a total of 17,663 people were employed as crew on tuna vessels or in tuna processing and ancillary work. Tuna-related employment in Kiribati therefore represents 4.5% of the regional tuna employment.

Table 9-14: Tuna-Related Employment in Kiribati

	2008	2009	2010	2011	2012	2013	2014
Processing and ancillary	10	3	7	15	57	75	75
Local crew	66	106	126	158	223	355	720
Total	76	109	133	173	280	430	795

Source: FFA (2015)

Many Kiribati men work on foreign-based offshore fishing vessels. Although there has not been a census of that type of work since an FFA study in 1997, a recent report on the trends in offshore fishing vessel employment opportunities for Kiribati (Gillett 2015) states: “The available information suggests that the opportunities for Kiribati crew have shifted. In general, Asian purse seining is rising while the original mainstay of Kiribati crew employment, the Japanese pole-and-line fleet, is contracting. Korean longlining (a source of significant I-Kiribati employment in the past) is also contracting.”

9.6 Levels of Fishery Resource Consumption

The following summarise some of the earlier studies of fish consumption in Kiribati:

- Nube (1989) reports the Kiribati canned fish imports for 1974–1986, ranging from 112 to 312 mt per year. Using information from the 1985 census, Nube estimated daily per capita fish consumption for the 18 islands in the Gilbert and Line groups as ranging from 0.45 kg in South Tarawa to 2.86 kg in Arorae. Of the 18 islands listed, 11 (61%) of the

islands have a per capita consumption of fish greater than one kg per day (i.e. greater than 365 kg/person/year).

- According to IMM (1993), the estimated catch in the Gilbert Group of Islands translates to an annual fish supply of 207 kg per capita.
- World Bank (1995), quoting FAO sources, 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.”
- World Bank (2000) recounts that, in Kiribati, 67% of total animal protein is from seafood.
- Using 1995 FAO production, import, and export data, Preston (2000) calculates that the annual per capita supply of seafood is 150 kg
- The 2003 annual report of the Fisheries Division (Fisheries Division 2004) states: “Results from the fish consumption surveys shows that the estimated fish consumption rate per head per day was 253.4 grams”. This equates to per capita consumption of 92.5 kg per year.
- The 2004 SPC ProcFish surveys at Abaiang, Abemama, Kuria and Kiritimati (Awira et al. 2009) gave an average annual per capita consumption of finfish of 106.9 kg, plus 2.57 kg for invertebrates.
- The 2006 annual report of the Fisheries Division (Fisheries Division 2008) states: “an average I-Kiribati consumes 241g of fish per day (2000 to 2003 estimates: Statistics Unit, Fisheries Division)”. This equates to per capita consumption of 87.9 kg per year.

Data in Sullivan and Ram-Bidesi (2008) indicate an annual tuna catch in South Tarawa of 1,584 mt per year. Considering the population of 40,311 in South Tarawa, the apparent annual per capita consumption is about 39 kg of tuna. Their summary statement indicates: “What is clear is that (a) fish and fish products remain a very significant part of total animal protein supply in Kiribati and (b) tuna species remain the single most common and important marine resource consumed in Kiribati.”

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 all of Kiribati the annual per capita fish consumption (whole weight equivalent) was 62.2 kg, of which 92% was fresh fish. For rural areas the figure for per

capita consumption of fish was 58.0 kg, and for urban areas it was 67.3 kg. However, there is some contention that the 2006 HIES data underestimate fish production and consumption.

The report of the recent MACBIO study (Rouatu et al. 2015) indicates that the weighted average annual per capita fish consumption in Kiribati is 74 kg. The MACBIO fish consumption figures were extrapolated from data from unpublished Fisheries Department surveys in the period 2011 to 2013 at Aranuka, Butaritari, Nikunau, Tamana and Beru. The section above on Kiribati coastal fishing presents some arguments about why the 74 kg could be considered too low.

A relatively recent addition to the fish supply in Tarawa derives from the Kiribati government's policy of requiring all fish rejected during purse seine transshipment operations to be given free to the government-owned CPP. 373.9 mt of rejected fish was sold by CPP to the public in 2014 (unpublished CPP data), which represents around 7.5 kg per capita of rejected fish, which is sold to residents of South Tarawa and Betio annually.

Several features emerge from the above fish consumption studies:

- There is a large amount of variation in annual per capita consumption rates between studies, and between islands within studies.
- Some of the earlier studies indicate that Kiribati has the highest rate of fish consumption compared to any country in the world.
- Some of the studies that produced low fish consumption rates could have used the food weight of the fish instead of the whole fish weight equivalent.

9.7 Exchange Rates

Kiribati uses the Australian dollar (A\$). The average yearly exchange rates (A\$ to the US dollar) used in this book are as follows:

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
1.36	1.31	1.32	1.19	1.10	1.12	0.10	0.98	0.96	1.12	1.22