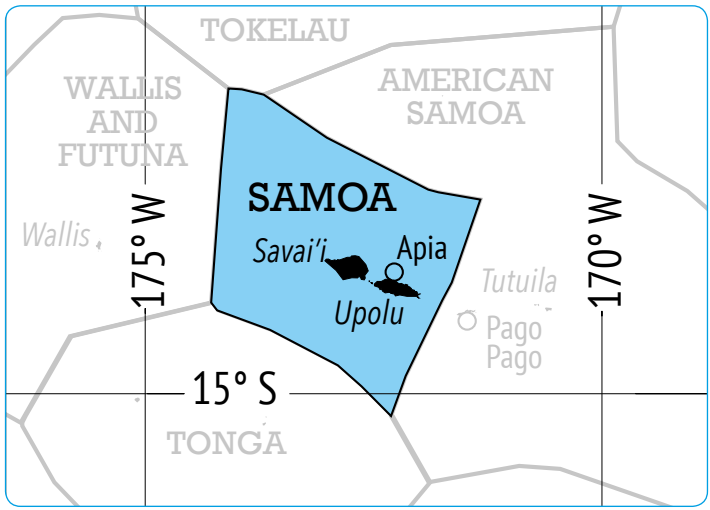
15 Samoa



15.1 Volumes and Values of Fish Harvests in Samoa

The widespread use of "alia" catamaran fishing craft is unique to Samoa. Categorising Samoan fishing activity requires special attention. While it is recognised that those vessels are not of industrial scale, due to the type of fishing gear used and the difficulty of separating the catch from those vessels from larger catamaran and mono-hull vessels, the catch from alia longliners in this book is considered to be a component of the "offshore locally based" catch.

Coastal Commercial Catches in Samoa

Samoa has devoted more attention to estimating the production from its small-scale fisheries than any other Pacific Island country. In order for this study to benefit from that effort, it is worthwhile recording the various surveys and associated results, with observations, as follows:

Mulipola et al. (2007) reviewed the history of those efforts to estimate catches:

- The first assessment of Samoa's fisheries was completed by the Department of Statistics in 1978. About 48 villages on both Upolu and Savaii were surveyed for one week each quarter over the course of the year to determine total landings and seafood consumption. Offshore landings for the year were estimated at 424 mt, while inshore landings were estimated at 666 mt.
- In 1991 the Fisheries Division and FAO conducted the Inshore Resource Assessment Project. Originally intended to be nationwide, the study focused on Upolu due to damage sustained on Savaii during the cyclones in 1990 and 1991. It was estimated that total inshore fisheries production in all of Samoa was 4,800 mt per year.
- In a 1997 study of the subsistence and artisanal fisheries of Savaii, additional analysis of data from the 1991 study was also included. The study estimated total inshore production in all of Samoa to be 4,200 mt per year.
- A nationwide household fisheries survey was undertaken in October and November 2000 to collect subsistence fisheries data and to profile Samoan village fisheries. The survey covered 1092 households in 66 villages, 40 in Upolu and 26 in Savaii, i.e. a 20% coverage of villages and a 5% coverage of Samoa's households. The survey was based on respondent's recall of their fishing activities and seafood consumption patterns, rather than on direct measurements such as creel surveys or weighing food items to be consumed. The total coastal catch for the year 2000 was estimated at 7,169 tons, with a value of ST$45 million. A total of 2,876 tons was sold or given away, leaving 4,293 tons for home consumption.

Gillett and Lightfoot (2001) adjusted the results of the 2000 study for various features (e.g. the value of subsistence catch based on farm gate prices) to estimate a coastal commercial production of 3,086 mt (worth ST$19.9 million) and a coastal subsistence production of 4,293 mt (worth ST$ 21.6 million (Samoan Tala)).

The Samoan household income and expenditure survey (HIES) was carried out in 2002. Although the work was not fishery focused, the results of that work can be further analysed to provide considerable insight into coastal fisheries production in the country:

- The value of the annual coastal commercial catch was determined to be ST$30 million, and the value of annual coastal subsistence catch was ST$22.8 million.
- The value of annual commercial catch divided by a commercial fish price of ST$7.36/kg indicates 4,076 mt of commercial catch from coastal fisheries.
- The value of annual subsistence catch divided by a fish price of ST$5.13/kg indicates 4,437 mt of subsistence catch.
- In summary, the 2002 HIES coastal fisheries production estimated:
  Coastal commercial catch: 4,076 mt, worth ST$30 million
  Coastal subsistence catch: 4,437 mt, worth ST$22.8 million

In 2003 the Fisheries Division completed two one-week creel surveys in 112 villages nationwide (Mulipola 2003). The survey estimated 11,700 fishers in Samoa with total landings of 12,270 mt.

Mulipola et al. (2007) describe the results of the most recent fishery-focused study that estimated coastal fisheries production, summarised as follows:

- 939 households in 49 villages (26 on Upolu, 23 on Savaii) were interviewed about their household composition, income, education level, seafood purchasing and consumption habits, fishing preferences, catch, and whether they sell fish.
- The fisheries data collected through household surveys were validated through a creel census.
- On the basis of per capita fish consumption, the study determined that total annual landings were 13,686 mt, worth ST$84 million.

Gillett (2009) compared the results of the 2000 HIES to the 2000 fisheries survey with respect to fish production. After correcting for fish price changes between 2000 and 2002, for the coastal commercial component the HIES gives 50% more value and 32% more volume than the 2000 fisheries survey. For the coastal subsistence fisheries the volumes/values are very close in the two studies (3% and 5% respectively). Discussions with an HIES specialist employed at SPC (C. Ryan, per. com. November 2008) indicated that the major difference between the two studies was the method of obtaining information from respondents. The HIES used individual diaries filled out by respondents over a two-week period (the HIES staff were able to stay in the selected villages during the entire two-week diary-keeping period), while the

2000 fisheries survey used general recall (e.g. "What is the usual amount of seafood caught by people in your household in one week?").

In the Gillett (2009) study, a modification of the coastal commercial fishery production estimate of the HIES study was used. The HIES volume was increased for population change during the period 2002–2007, and the value of this projected volume was priced according to the 2007 market and roadside fish prices, as given in Fisheries Division (2008): ST$12.41 per kg. Accordingly, the 2007 production from Samoa's coastal commercial fisheries was estimated to be 4,129 mt, worth ST$51,240,890. Including the estimate of the subsistence component (methodology given below in the coastal subsistence fishing section), the total coastal catch was estimated to be 8,624 mt in 2007.

Since the Gillett (2009) study Samoa Fisheries carried out a fisheries socio-economic survey in 2012 (Box 15-1), and the Fisheries Division continued its regular market survey work (described below).

Box 15-1: The 2012 Samoa Socio-Economic Fisheries Survey

The survey was implemented in 100 villages in June and July, 2012 (56 in Upolu and 44 in Savaii), which was about 30% of the total number of villages in Samoa. A total of 881 households surveyed–584 in Upolu and 297 in Savaii.

The objective of the survey was to gauge the status of fishing activities relative to the fisheries management and marine conservation programs at the village level and how these impact these fishing activities. Households were surveyed on their income and expenses, fishing activities methods and gears, catch usage (whether they are sold, given away or consumed) and post-harvest methods. Fishing activities were analysed in males and female groups and at the village level with respect to two different management programs.

The results of the survey showed that in 2012:

- The estimated total finfish catch was 9,066.32 mt/year, with an estimated value of ST$89 million. The estimated catch of invertebrates was 7,804.42 mt/year with an estimated value of ST$86 million in income generated.
- The total annual coastal catch (commercial/subsistence and finfish/invertebrates) was 16,870 mt.
- The average consumption per capita was 46.2 kg/year for finfish and invertebrates with 54.7 kg/year.
- Other important fishing activities such as fishing efforts, catch per unit effort, fishing sites and so forth were determined and reported.

Source: Tiitii et al. (2014)

Over many years the Fisheries Division has carried out a programme of regular surveys of the landings of inshore fisheries catch that are sold. These surveys are conducted at four main market outlets, such as Fugalei Agriculture market, Apia fish market and Salelologa fish market, in three sampling days randomly selected. Roadside sales were sampled once per week. The 2013/2014 Fisheries Division Annual Report (Fisheries Division 2014) gives the results for that fiscal year. The overall estimate of inshore landings of fishery products traded at the local market outlets was ST$1.3 million, with a volume of 113 metric tons during the fiscal year. An examination of Fisheries Division Annual reports shows that the total annual volume recorded by these Fisheries Division surveys has ranged from 110 mt to 136 mt since 2005.

Some observations can be made in comparing the results of the 2012 Samoa Socio-Economic Fisheries Survey (Box 15-1) and the regular outlet surveys, above:

- If it is assumed that the amount of commercial catch is approximately equal to the subsistence catch (as suggested by many of the previous surveys), then the socio-economic survey gives a coastal catch about 75 times greater than the outlet surveys.
- The volumes of total coastal catch estimated by both the socio-economic survey and the outlet surveys appear to be outliers among the many surveys of Samoa's coastal catches. In other words, the 226 mt of the outlet surveys[1] and the 16,870 mt of the socio-economic survey are very different from the 8,000 mt to 9,000 mt suggested by many of the previous surveys.

During the short period of the present survey (1.5 days in Apia) it was not possible to reconcile the irregularities noted above. It is possible, however, to provide thoughts on possible sources of the differences:

- It appears that the quantity of commercial fish given in the annual report actually refers to the amount of fish that was monitored, or alternatively the monitored fish was not adequately extrapolated to reflect all coastal commercial catches in Samoa.
- Discussions with staff of the Samoa Bureau of Statistics indicate that they have examined the results of the 2012 socioeconomic fisheries survey. They do not use the results in their macroeconomic work, as they feel that the survey was over-focussed on fishing communities and therefore was not representative of all of Samoa. Currently, they are using the results of the most recent HIES to estimate coastal fish production.

1 Assuming that the volume of commercial catch is about equal to the subsistence catch.

- On the other hand, according to Fisheries Division staff, non-coastal villages were purposely included in the socio-economic survey to eliminate a bias towards fishing communities – so the surveyed villages are, on that basis, representative of all Samoa.

Since the Gillett (2009) estimate of the 2007 production from Samoa's coastal commercial fisheries of 4,129 mt, worth ST$51,240,890, the following has occurred:

- The population of the country has increased by 3.3% (SPC's PRISM website data).
- The 2009 tsunami resulted in some destruction of fishing gear/boats, a reluctance by some people (at least temporarily) to fish in the ocean, and a relocation of some coastal villages.
- Some fishing gear/boats were destroyed in 2012 during tropical cyclone Evan.

With respect to prices paid to fishers for coastal finfish and invertebrates, discussions were held with the staff of the Fisheries Division, and fish prices in the annual reports were examined. For the purpose of the present study, the price of ST$8.50 is used. This is likely to more realistic than the price paid to fishers used in the Gillett (2009) study (ST$12.41/kg).

The present study deems the total catch from Samoa's coastal fisheries in 2014 to be 10,000 mt, with the coastal commercial fisheries in the country providing 5,000 mt, worth ST$42.5 million to fishers.

Coastal Subsistence Catches

Following the above discussion, it is estimated that coastal subsistence fisheries in Samoa in 2014 caught 5,000 mt of finfish and invertebrates. Taking 70% of the above commercial fish price (using the farm gate approach for valuing subsistence production) this was worth ST$29.75 million.

Locally Based Offshore Catches

Fisheries Division (2015) states that, in 2014, the locally based offshore fleet consisted of 42 longline vessels: 20 alia catamarans (under 11 m), 9 vessels from 11 m to 20.5 m, and 4 vessels greater than 20.5 m. All of the 2014 catch was made within the Samoa EEZ.

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 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 the "catch by national fleet" and "value by national fleet" spreadsheets of FFA (2015)(Table 15-1).

Table 15-1: Volume and Value of the Catch by the Locally Based Offshore Flee

	2010	2011	2012	2013	2014
Volume tuna catch (mt)	3,090	1,932	2,352	2,020	1,091
Delivered value tuna catch (US$)	11,247,834	8,780,682	9,982,534	7,158,455	4,574,813
Volume catch adjusted for bycatch (mt)	3,553	2,221	2,704.8	2,323	1,254
Catch value adjusted[2] for delivery costs and value of bycatch (US$)	11,472,791	8,956,296	10,182,185	7,301,624	4,666,309

Source: FFA (2015)

The 2014 catch by Samoa's locally based offshore fleet was 1,254 mt, with an Apia dockside value of US$4,666,309 (or ST$11,152,478).

Foreign-Based Offshore Catches

In 2014 there were few, if any, foreign-based offshore catches in the Samoa EEZ. Fisheries Division (2015) shows no such catches, and FFA (2015) shows only a tiny amount.

Freshwater Catches

ADB (2008) reports that 2% of all households in Samoa engage in at least some fishing in inland rivers and lakes.

Staff of the Fisheries Division report that the main freshwater fishery species are tilapia (there are occasionally roadside sales near lakes), eels and freshwater shrimps. The total annual harvest is unknown, but is likely to be about 10 mt per year.

This 10 mt can be valued with the approach used above for coastal subsistence catches, which results in an annual value for freshwater catches of about ST$54,259.

2 The values from the FFA (2015) spreadsheet (tuna prices at destination ports) have been adjusted for transport charges, to arrive at Apia dockside prices, and adjusted for the value of the bycatch.

Aquaculture Harvests

Fisheries Division (2013) contains a summary of tilapia farms in Samoa and their estimated production for the last six years. For FY 2012/2013 1,220 kg of tilapia was produced, with a value of ST$6,100. The average annual yield during the six-year period was 1,817 kg, worth ST$9,086.

Fisheries Division (2014) states: "twenty new tilapia farms were established within the fiscal year including a community farm being reactivated. This increased the number of tilapia farms in Samoa from forty four[3] to sixty four… The new Marine Multispecies Hatchery in Toloa was opened on the 21st February, 2014. The facility included a laboratory, wet-lab, office, 3 cement raceways, water and air-blower systems, bedrooms and showering facilities. Two giant clam spawning were conducted within this fiscal year, however was unsuccessful due to bad weather stressing out the clams before they could spawn."

Fisheries Division staff indicated that, in 2014, about 12 mt of tilapia was produced. As the farm gate price was between ST$5 and ST$6 per kg, the annual production was worth about ST$66,000.

While Samoa has some culturing of tridacna, seagrapes, mudcrabs and prawns, the amounts produced and sold in 2014 were very small.

Summary of Harvests

A crude approximation of the annual volumes and values[4] of the fishery and aquaculture harvests in Samoa in 2014 can be made from the above sections (Table 15-2).

Table 15-2: Fisheries and Aquaculture Harvest in Samoa, 2014

Harvest Sector	Volume (mt)	Value (ST$)
Coastal Commercial	5,000	42,500,000
Coastal Subsistence	5,000	29,750,000
Offshore Locally based	1,254	11,152,478
Offshore Foreign-based	0	0
Freshwater	10	54,259
Aquaculture	12	66,000
Total	**11,276**	**83,522,737**

3 With the production 1,220 kg of tilapia in FY 2012/2013, the 44 farms produced an average of 27.7 kg of tilapia per farm during the year.

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

Figures 15-1 and 15-2 show the volumes and values of the 2014 Samoa fisheries production.

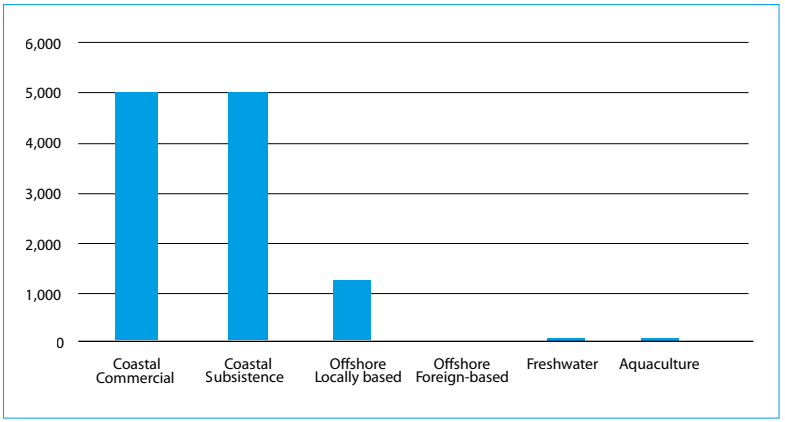


Figure 15-1: Samoa Fisheries Production by Volume (mt), 2014

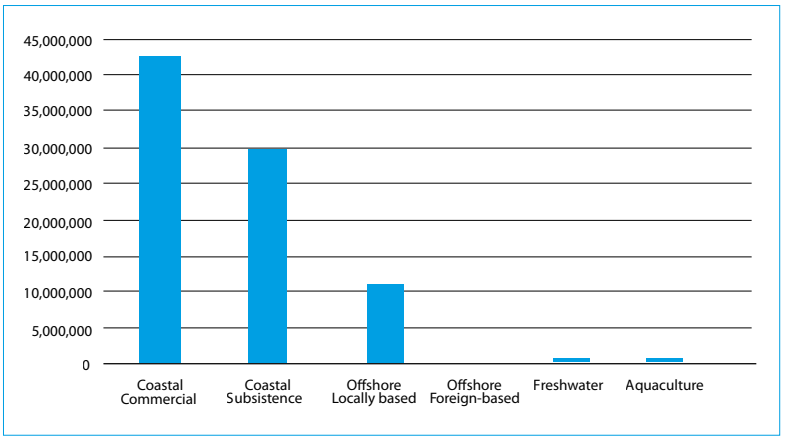


Figure 15-2: Samoa Fisheries Production by Value (ST$), 2014

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 Samoa from those three studies are provided in Table 15-3.[5]

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

Table 15-3: Estimates by the Benefish Studies of Annual Fisheries/Aquaculture Harvests

Harvest Sector	Estimate Year	Volume (mt, and pcs where indicated)	Nominal Value (ST$)
Coastal Commercial	1999	3,086	19,900,000
	2007	4,129	51,240,890
	2014	5,000	42,500,000
Coastal Subsistence	1999	4,293	21,594,000
	2007	4,495	39,048,065
	2014	5,000	29,750,000
Offshore Locally based	1999	5,156	29,748,440
	2007	3,755	21,910,631
	2014	1,254	11,152,478
Offshore Foreign-based	1999	100	300,000
	2007	25	129,166
	2014	0	0
Freshwater	1999	n/a	n/a
	2007	10	87,000
	2014	10	54,259
Aquaculture	1999	n/a	n/a
	2007	12	66,000
	2014	10	87,000

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

The apparent changes in production for the three years sometimes represents a real change in production, but it can also reflect a change in the methodology for how the production is measured (hopefully an improvement). In the table above, the production levels for coastal commercial and coastal subsistence fisheries increase gradually between the years. That increase largely reflects the perception held by fisheries stakeholders that production has increased. 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.

15.2 Contribution of Fishing to GDP

Current Official Contribution

The contribution of fishing to GDP, as stated in the Samoa Bureau of Statistics March 2015 Quarterly Report (SBS 2015), is given in Table 15-4.

Table 15-4: Official Contribution of Fishing to GDP

	2010	2011	2012	2013	2014
Fishing ('000s of ST$)	30,898	52,470	44,982	40,360	57,467
Samoa GDP ('000s of ST$)	1,689,968	1,824,699	1,834,409	1,859,661	1,922,057
Fishing as a % of GDP	6.5%	3.8%	4.5%	5.0%	3.5%

Source: SBS (2015)

Method Used to Calculate the Official Fishing Contribution to GDP

Staff of the Samoa Bureau of Statistics (A. Salani, per. com. September 2015) explained how the fishing contribution of GDP is calculated. The value added from fishing aggregates two components: monetary fishing and non-monetary fishing. Monetary fishing is comprised of:

- inshore catches that are sold;
- offshore tuna and other fish purchased and consumed;
- exports – tuna for canning;
- exports – air freight chilled; and
- all other fishery exports

The total of the value of the above five categories of monetary fishing is multiplied by a value added ratio of 0.85 to obtain the value added (equivalent to the contribution to GDP) for monetary fishing. For subsistence fishing the value of the subsistence catch is multiplied by a value added ratio of 0.95. The value of the subsistence catch is determined by the results of the most recent household income and expenditure survey, adjusted yearly.

Alternative Estimate of Fishing Contribution to GDP

Table 15-5, below, represents an alternative to the official method of estimating fishing contribution to GDP in Samoa. 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 15.1, above (summarised in Table 15-2), 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 15-5 replace the official methodology, but rather that the results obtained serve as comparator to gain additional information about the appropriateness and accuracy of the official methodology, and to indicate any need for its modification.

Table 15-5: Fishing Contribution to GDP in 2014 Using an Alternative Approach

Harvest Sector	Gross Value of Production ($ST, from table 15-2)	VAR	Value Added (ST$)
Coastal Commercial	42,500,000	0.80	34,000,000
Coastal Subsistence	29,750,000	0.90	26,775,000
Offshore Locally based [6]	11,152,478	0.40	4,460,991
Freshwater	54,259	0.90	48,833
Aquaculture	66,000	0.74	48,840
Total (ST$)	**83,522,737**	--	**65,333,664**

The total value added from fishing in Table 15-5 (ST$65,333,664) is 14% greater than the official estimate of ST$57,467,000. It is difficult to determine the source of the difference, because the specific amounts of the value added for monetary fishing and subsistence fishing in the official estimate are not readily available. However, it is likely that the inshore commercial catches and subsistence catches in the official estimate are smaller than those in the recalculated estimate, because they come from the HIES rather than from the fisheries surveys.

The total value added from fishing in Table 15-5 (ST$65,333,664) for 2014 is less than that calculated in the Gillett (2009) study (ST$85,042,903) for 2014. This stems both from changes in the fisheries and from changes in methodology. Offshore fishing dropped considerably between those years (the 2014 catch was one-third of the 2007 catch). In 2014 better information was available for prices of coastal fisheries products.

15.3 Exports of Fishery Production

The Quarterly Merchandise Trade report for March 2015 (SBS 2015) gives Samoa's fish exports and total exports (Table 15-6). It can be seen that the fish exports of the country are declining, in both relative and absolute terms.

6 Hamilton (2007) is an economic study of local longlining in Samoa. It determined that the value added ratios for alia tuna longlining in Samoa were 0.46, and for conventional tuna longlining were 0.38.

Table 15-6: Value of Fishery Product Exports (ST$ thousands)

	2012	2013	2014
Fish exports (ST$ thousands)	18,189	10,740	5,562
Total exports (ST$ thousands)	176,428	144,103	117,400
Fish as a% of all exports	10.3%	7.5%	4.7%

Source SBS (2015)

The Fisheries Division Annual Report 2013/2014 (Fisheries Division 2014) gives fish exports for a slightly different period: the fiscal year from 1 July 2013 to 30 June 2014. The report states: "Fish exported this fiscal year was estimated to be 1,035 metric tons valued at about 7million tala".

The Customs Department, the Central Bank of Samoa and the Fisheries Division all record the fishery exports of Samoa. Because the information for each of the three agencies comes from the same document the amounts recorded by each agency should be identical. In practice, they are all slightly different. This is probably because of the difficulties associated with compiling summaries from a large number of export documents.

According to Fisheries Division staff, export bans on several types of fishery products (coral, aquarium fish and beche-de-mer) that started in 1997 have resulted in almost all commercial fishery exports in recent years being tuna products.

15.4 Government Revenue from Fisheries

Access Fees for Foreign Fishing

In 2014 the only authorised foreign fishing in the Samoa zone was by vessels covered by the US Tuna Treaty. Despite that there was no fishing by that fleet in Samoan waters in 2014, the country nonetheless received a payment under the treaty's licensing arrangements. According to FFA staff, for the 26th licensing period of the treaty (the one-year period ending June 14, 2014), Samoa received US$555,815 (ST$1,328,395) as its share of treaty money that is divided equally amongst the treaty parties.

The total revenue of the Samoa government for the fiscal year ending 30 June 2014 was ST$473.6 million (ADB 2015). Therefore the ST$1,328,395 in access fees is equivalent to 0.3% of the total revenue of the Samoa government for that year.

Other Government Revenue from Fisheries

Apart from access fees for foreign fishing, the other major source of government revenue from fisheries is from licensing of domestic fishing vessels. In FY 2013/2014 ST$89,400 was collected from the 64 longliners based in Samoa. The fees range from ST$200 for vessels under 11 m to ST$10,000 for vessels over 20.5 m. (Fisheries Division 2014)

The government also receives money from licensing fisheries processing establishments (ST$1,050 per licence), export certificates (ST$5 to ST$10 per certificate; ST$$2,279 collected during the FY), market table renting (ST$10 per day), the sale of ice, and transshipment (ST$0.10 per kg). The total amount of money collected for most of these items for FY 2013/2014 is not readily available from the Fisheries Division.

15.5 Fisheries-Related Employment

A socio-economic fisheries survey was carried out in June and July 2012 (Tiitii et al. 2014). The survey was implemented in 100 villages (about 30% of the total villages in Samoa), and 881 households were surveyed. Some of the results of the survey are relevant to fisheries-related employment. Overall, the survey found that fishing is third, to agriculture and paid salary, in terms of income source. Nonetheless, fishing remains an extremely important source of household income for the village households under study. On average, 14% of all households ranked fishing as their first source of household income; the average for coastal communities was higher, at 18%. Fishing was ranked as the second-most important source of income for 8.5% of all households on average. The report of the survey contained a considerable amount of information on the gender aspects of fishing (Box 15-2).

Box 15-2: Gender Aspects of Coastal Fishing in Samoa

Male and female fishers are mainly commercially oriented for finfish. All fishers target mostly coastal reef and lagoon habitats, and only men fish for pelagic fish or in the open seas and mangrove areas; there are a few women, however, who fish on the outer reefs. For invertebrates, women target mostly soft bottom species, while men mainly glean and dive for clams, octopus, lobster, mother of pearl, and beche-de-mer, and equally target reef tops and mangrove areas. Most fishers go out exclusively during the day, while the rest fish both night and day, depending on tidal and weather conditions. Reef gleaning is performed only during the day by both men and women while some diving for invertebrates such as lobsters, trochus, giant clams, sea cucumbers is performed at night. Boats are used mainly by men when diving and/or gleaning, especially for sea cucumbers, trochus, turban shells and seagrapes, while few women use boats when they glean. Both men and women fish around three times per week, with men fishing for an average of four hours and catching (on average) 13.7 kg per fishing trip, and women fishing for an average of five hours and catching (on average) 10 kg per fishing trip. Men fish about 10 months out of the year, and women fish for about 9 months out of the year. About 86% of male fishers and 91% of female fishers used one technique per fishing trip. Catch per unit of effort for men is 4.3 kg/hour and for women it is 2.22 kg/hour. The frequency of fishing for men diving for invertebrates is five times per week for an average of three hours per fishing trip, over 10 months of the year. Gleaning takes place three times per week, for an average of three hours per fishing trip over seven months of the year. Women, on the other hand, spend three hours diving for invertebrates four times per week, for an average of nine months out of the year. Women glean two times per week, for an average of 2.5 hours over seven months of the year.

Source: Tiitii et al. (2014)

A labour force survey was carried out in Samoa in 2012 (SBS 2012). The survey was designed to cover 10% of households in both urban and rural areas. Although the usefulness of the survey for fisheries purposes is limited by the fact that the report mostly uses the combined category "agriculture forestry and fishery workers", some of the results are relevant to fisheries. The survey determined that the working age population of Samoa is 117,487, of which 67,186 are involved in subsistence activities. The relative importance of fishing activities are given in Table 15-7. Of the working age population, 6.7% are involved in subsistence fishing. The report of the Labour Force Survey also indicated that, of the 7,880 people that are involved in subsistence fishing, 95.3% live in rural areas.

Table 15-7: Importance of Various Types of Subsistence Activities

Type of activity	Total people	Male		Female	
Farm production	50,883	34,837	68.5%	16,047	31.5%
Look after animals	32,030	19,438	60.7%	12,592	39.3%
Construction/ repair work	4,406	2,959	67.2%	1,447	32.8%
Catch fish	7,880	6,018	76.4%	1,862	23.6%
Fetch water/ collect firewood	22,556	13,446	59.6%	9,110	40.4%
Produce clothing, furniture	2,641	673	25.5%	1,967	64.5%

Source: SBS (2012)

An agricultural census was conducted in Samoa in 2009 as a joint exercise of the Samoa Bureau of Statistics and the Ministry of Agriculture and Fisheries (SBS 2012). The 2009 census aimed to measure household agricultural activity, and was able to compare results with a previous agriculture census in 1999. Some of the fisheries-relevant results of that survey are described below:

- The total number of households engaged in fishing during the reference period was 5,752. Of these, 63% of households engaged in fishing reside in Upolu, and 37% reside in Savaii. Samoa's vulnerability to abnormal weather patterns, coupled with the devastating tsunami in 2009, are likely to be contributing factors to the significant drop of 14% in the total number of households engaged in fishing activities since 1999. Overall, the total number of households engaged in fishing fell by 5,132, or 47 percentage points, over the two decades.
- The main purpose of engaging in fishing was for home consumption only. However, some households also occasionally sold some of their catch. As reported in 2009, only 146 households (2.5%) of 5,752 fished mainly for commercial purposes: 1,842 (32%) occasionally sold and the majority – 3,764 (65%) – engaged in fishing for household consumption only.
- Fishing appears to have grown as a minor source of income, in comparing 2009 with 1999. In 2009, 39% of fishing households sold some or all of their catch, compared with 33% in 1999. In 2009, 14% of households engaged in fishing reported having sold about one-quarter of their fish catch, 12% sold about half, 10% sold three-quarters and 2.2% sold all of their catch

- On average, two members of each fishing household engaged in fishing in 1999 and 2009. There were more males (81%) than females (19%) involved in fishing activities in 2009. However there was an increase in the number of females engaged in fishing of 28% between 1999 and 2009, while the number of males engaged in fishing fell. This trend is consistent across the regions, except in Apia, where both the number and proportion of females engaged in fishing has fallen.

Examination of the results of an earlier fisheries survey is useful for comparison purposes. Mulipola et al. (2007) is a report of a survey conducted to assess the socio-economic status of rural villages with regard to fishing practices. Some of the results that are relevant to employment are summarised below:

- Although only 7.26% of the population are fishers, 41.7% of households have at least one fisher. Extrapolated to the population of Samoa, there are approximately 12,844 fishers in Samoa.
- With respect to the relative importance of income sources, over 60% of households received regular remittances from relatives overseas. Over 50% of households have a member earning income from a wage paying or salaried job. About 23% of households reported an income from fishing.
- In households with fishing incomes, fishing contributed an average of 41% to the total household income.
- Traditionally, women's fishing roles has been limited to gleaning shellfish or sea cucumbers in shallow areas along the shore. However, there seems to have been a sharp decline in the relative number of female fishers, from 18% in 1991 and 1997 to 13.5% now. Respondents suggested that it is more difficult to find the organisms nowadays compared to previous years.

McCoy et al. (2015) summarises the various reports on tuna-related employment in Samoa:

> Gillett (2009) estimated a total of 295 people employed in Samoa's tuna fisheries, with about 86% from local jobs on vessels and the remaining 14% from local jobs in shore facilities. FFA (2014) places the number of people employed in 2013 in processing and ancillary jobs at 33, and the number of local crew at 220. Crewing numbers have gone down in each of the three years preceding 2013 when a high of 307 was recorded. In 2015 some additional processing jobs will likely be created with the opening

of the longline receiving and packing facility at the main wharf. The number of people employed onboard vessels is likely to be somewhat less in 2015 due to fewer alias engaged in the longline fishery. An earlier report, Hamilton (2007) estimated the number of jobs per catch for alias and the large longliners. The author's conclusion was that the alias provided 16 jobs for every 100 mt of catch, while the large longliners resulted in just 5 employees for the same amount of catch. Of the 11 large longliners in operation in February, 2015, seven had Samoan captains while four were captained by expatriates. Most of the expatriates have been in Samoa for a long time, some arriving with the vessels 10 to 15 years earlier and now have family ties to Samoa and are resident in the country.

15.6 Levels of Fishery Resource Consumption

Table 15-8, below, summarises recent estimates of fish consumption in Samoa. It can be seen that there is some inconsistency, or at least lack of clarity, in what is being measured (e.g. fresh fish only, fresh plus canned) and how it is measured (e.g. fish actually consumed or whole fish equivalent).

Table 15-8: Estimates of Per Capita Fisheries Consumption in Samoa, Various Years

Source	Year for estimate	Estimate	Comments
Tiitii et al. (2014)	2012	Finfish: Annual per capita consumption is 46.15 kg/ year Invertebrates: Annual consumption is 54.74 kg/ year Canned fish: Annual consumption is 28.61 kg/year	The report contains the note: "Invert consumption refers to whole fish equivalent. For example, for giant clams, includes weight of shells"
Bell et al. (2009)	2001 to 2006	From HIES surveys conducted between 2001 and 2006. Per capita fish consumption (whole weight equivalent) was 45.6 kg per year for urban and 98.3 kg per year for rural.	
Mulipola et al. (2007)	2006	Fresh fish: • average frequency of consumption of finfish = 2.8 per days/week, invertebrates = 0.8 days/ week • average per capita consumption per year = 59.4 kg, (163g/ day) • total consumption per year = 10,508 mt (7,900 mt for Upolu, 2,608 mt for Savaii) Tinned fish: • average frequency of consumption = 4.5 days/ week • average per capita consumption = 73 kg/year (206 g/person/day) • 8,120 mt of tinned fish consumed per year in Samoa	Based on asking people to estimate their usual catch The study appears to use food actually consumed
Lambeth (2001)	1990s	Women contribute around 23% of the total weight of seafood. Because women collect the majority of marine invertebrates in Samoa, it is estimated that they provide 20% of the per capita seafood consumption of 71 kg per year, consisting of 44 kg of fresh fish, 13 kg of invertebrates and seaweed, and 14 kg of canned fish	Gender oriented survey applied to earlier consumption data

15.7 Exchange Rates

The average yearly exchange rates (Samoan Tala (ST$) to the US dollar) used in this book are as follows:

2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
2.78	2.71	2.78	2.62	2.52	2.50	2.35	2.36	2.28	2.33	2.39