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SAMOA

GENERAL ECONOMIC DATA¹

Land area²:	2,935 sq. km
Shelf area (to 200m):	4,500 sq. km
Ocean area:	120,000 sq. km
Length of coastline:	447 km
Population (1999) ³ :	168,000
Gross Domestic Product (1999) ⁴ :	US\$ 230.1 million
Fishing contribution to GDP (1999):	US\$ 15.3 million
GDP per caput (1999):	US\$ 1,370

FISHERIES DATA

Commodity balance (1999):

	Produc- tion	Imports	Exports	Total supply	Per caput supply
	Tonnes liveweight equivalent				kg/yr
Fish for direct human consumption ⁵	12,535	2,450	4,657	10,328	61.5
Fish for animal feed and other purposes	0	0	0	0	

Estimated employment (1999):

(i) Primary sector:	900
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STRUCTURE AND CHARACTERISTICS OF THE INDUSTRY

General

Samoa consists of two main islands, Upolu and Savaii, seven smaller islands (two of which are inhabited), and several islets and rock outcrops. The total land area is 2,935 sq. km. The 1999 population of about 168,000 reside in 326 villages, of which 68% are on the island of Upolu. About 230 villages are considered to be coastal villages.

Barrier reefs enclosing narrow lagoons encircle much of the coastline except for the north coast of Upolu, the main island, where there is an extensive shelf area which extends up to 14 miles offshore. There are few freshwater bodies of any significance and thus no important inland fisheries, although a number of aquaculture projects are under way. Marine fisheries are predominant, but due to the proximity of neighbouring countries (American Samoa, Wallis and Futuna, Tokelau and Tonga) Samoa's EEZ does not extend to 200 nautical miles offshore in any direction, and at 120,000 sq. km. the EEZ area is the smallest in the Pacific Islands region.

Two large tuna canneries located in nearby American Samoa have major implications for Samoa. They provide jobs to about 3,000 Samoans as well as a ready market for tuna catches by Samoa's longline fleet.

Marine fisheries

Nearshore fishing is undertaken by villagers operating in shallow lagoon waters adjacent to their lands. Fishing occurs from canoes or other small vessels, or on foot, and may involve the use of spears, nets, or hook and line, or, in the case of sessile invertebrates, simple hand-gleaning. Fishing is for both subsistence and commercial purposes, with a significant overlap between the two. The subsistence fishery was estimated to have landed about 4,293 t of fish and invertebrates in 1999. Small-scale commercial fishing was responsible for an additional 3,000 t. The most important resources for Samoa's small-scale fisheries are: finfish (especially surgeonfish, grouper, mullet, carangids, rabbit fish), octopus, giant clams, beche de mer, turbo, and crab.

Commercial fishing is carried out outside the reefs and offshore by a large fleet of catamarans, typically 9 to 10 m in length and powered by 40 hp outboard motors. Since the introduction of this FAO craft design, the alia, in the mid-1970s, more than 320 have been locally built. The first 120 craft were constructed in plywood and, later 200 more were built from welded aluminium. In the early to mid 1980s the alia fleet numbered some 200 craft. Initially much of the fleet engaged in bottom fishing along the southern shelf area and reef slopes, landing high-value deep-water snappers for air-export to Hawaii. However as the deep-bottom resource became more heavily exploited, fishing effort began to be re-directed offshore, with fishermen targeting skipjack and small yellowfin tunas by trolling around fish aggregation devices (FADs). This fishery has in the past produced a catch of around 2,000 t/ yr.

Despite an active FAD deployment programme run by the Government, continued FAD losses and a number of other factors contributed to a decline in the fleet to around 100 vessels by the late 1980s. The fleet was reduced still further, to only 40 vessels, as a result of the destruction caused by two severe cyclones which struck Samoa in 1991, and the catch from the fleet fell to around 200 t annually.

A vessel reconstruction programme and the introduction of effective small-scale longline fishing techniques and gear in the early 1990s saw the number of alia grow rapidly during the decade. The development in the mid-1990s of an export market for albacore and other tuna resulted in further expansion in the fishery. By 1999 the catches by locally-based longline vessels were about 5,000 tonnes worth US\$10 million. The status of the tuna fleet in 2000 was:

- Conventional 9 to 10 m alia: about 119 vessels operating; 63% based in the Apia urban area;
- 10 to 12.5 m catamarans and monohull longliners: about 20 operating; 89% based in the Apia urban area;
- 12 to 15 m catamarans and monohull longliners: 9 operating; 100% based in the Apia urban area;
- Monohull longliners greater than 15 m: 6 operating; 100% based in the Apia urban area.

The catch made by the tuna longliners in recent years is comprised of 71% albacore, 12% yellowfin, 5% bigeye, and 12% other species.

According to the Fisheries Division, 41 alia fishermen have lost their lives at sea since 1996. Many of the safety problems appear related to the use of small catamarans at considerable distance from land. In 2001 Samoan fishermen drifted as far away as Papua New Guinea.

There is relatively little foreign fishing activity in the Samoa zone. This is due to both the small size of the Samoa zone and the fact that the productive areas for purse seine fishing and longline fishing are located to the north and south, respectively. The foreign tuna catch in recent years is mainly from US purse seiners transiting the zone between their base in nearby American Samoa and the fishing grounds to the northwest.

Inland fisheries

Samoa has limited freshwater resources and consequently there are only a small number of freshwater fish species and no significant fisheries. A study of Afulilo basin in the early 1990s revealed only freshwater eel (*Anguilla* sp.), pipefish (*Dorichthys* sp.), jungle perch (*Kuhlia rupestris*), and two species of goby (*Sicyopterus micrurus* and *Stiphon elegans*).

Aquaculture

Aquaculture development efforts in Samoa have historically been directed at providing alternative sources of fishery products, mainly through the introduction of

exotic species. Trials have included:

Mussels: Philippine green mussel *Perna viridis*;

Tilapia: *Oreochromis mossambicus* and *O. niloticus*;

Carp: *Carassius auratus*;

Oysters: Pacific oyster *Crassostrea gigas*;

Trochus: *Trochus niloticus*

Giant clams: *Tridacna gigas* and *T. derasa*;

Freshwater prawn: *Macrobrachium rosenbergii*;

Marine prawn: *Penaeus monodon*;

Seaweeds: *euchema Kappaphycus alvarezii* and *Euchema denticulatum*.

In the past few years the Fisheries Division has focused on three areas of aquaculture development: stocking tilapia, restocking inshore areas with giant clam, and the release of green snail on suitable reefs.

The most significant undertaking in recent times is the tilapia demonstration farm established in 1993. Despite early problems of management and feed quality, several farms were subsequently established. By late 2000, there were 19 tilapia farms in Samoa: 11 on Upolu and 8 on Savaii. Between October 1999 and May 2000 about 4,000 tilapia were stocked in 9 ponds. According to the Fisheries Division, the tilapia grow to harvestable size within 6 months provided they are cared for properly.

Hatchery-reared young giant clams have been introduced to village fishing reserves established under a community fisheries management project. Monitoring of growth rates suggests that these clams will reach reproductive age within 3-5 years from introduction. About 1,700 young clams were provided to villages in 1999 - 2000.

A recently-completed fisheries project sponsored by Australia contained an aquaculture component in which the potential for aquaculture in Samoa was assessed. The results of that study concluded that (a) further assessment trials be undertaken with triploid Pacific oyster, (b) culture trials be undertaken with green mussel should a source of spat become available, and (c) trochus should be introduced into the country.

Utilization of the catch

Marine organisms are an important protein source in the diet of many of Samoa's coastal communities and also provide the primary source of income for some individuals and households. Fishery products are now Samoa's largest export.

With respect to distribution of the 1999 catch, 34% was for own-use home consumption, 25% for local sales, and 41% for export.

The 1999 Agriculture census indicated:

- 70% of the 6,699 fishing households did not sell any of the catch;
- Of the households that did sell some of their catch, about 31% sold half of their catch, 29% sold about one-quarter, 24% sold about three-quarters, and 20% sold all their catch.

Four export companies purchase tuna from the fishermen to export either frozen to the two canneries in American Samoa or fresh chilled to Hawaii, the United States mainland, Australia and New Zealand.

Demand

A recent fish consumption study using dietary recall indicated that in Samoa the average consumption of local seafood per capita is 57 kg per annum, made up of 44 kg of fish, and 13 kg of invertebrates and seaweed. In addition, canned fish consumption per capita is 14 kg per annum. The total (local plus imports) consumption is therefore 71 kg per capita per year.

Alternatively, data on fishery production, import, and export, suggest that the annual per capita consumption of fishery products in Samoa was 61.5 kg in 1999.

Economic role of the fishing industry

The 1999 Agriculture census indicated that one-third of the total number of households in Samoa were engaged in some form of fishing during the week prior to the census. The total number of people engaged in some form of fishing during the week prior to the census was 10,142. In addition, 1% of households had members who were formally employed in fishing.

The total value of the fisheries of Samoa was about US\$23.6 million, made up of:

- Subsistence, US\$7,143,000;
- Coastal commercial, US\$6,583,000;
- Offshore locally-based, US\$9,840,000.

Tuna is now the most important export of the country. According to the Samoa Treasury Department, 71.8% of all Samoa exports in 1999 were fish. The Fisheries Division indicates that 82% of all fish exports were tuna or fish caught while fishing for tuna. Tuna alone was therefore responsible for about 60% of all exports from the country in 1999.

A recent ADB examined the contribution of fishing to the economy of Samoa. It concluded that fishing was responsible for about 6.6% of the GDP of the country.

DEVELOPMENT PROSPECTS

Heavy exploitation of coastal waters coupled with the deleterious effects of destructive fishing methods, coastal development and occasional severe cyclones have led to important declines in inshore fishery productivity in many areas around Samoa. A recently completed six-year project encouraged the establishment of community-based inshore fishery management arrangements to address the restoration of these fisheries. As a result, thirty percent of Samoa's approximately 230 coastal villages now have village fishery management plans. Marine reserves, a major tool of management at these villages, have been established at approximately 60 locations. The effectiveness of these management systems in arresting resource declines should be apparent in a few years.

The shelf area around Samoa's two main islands has been variously estimated as holding deep-water bottom-fish stocks sufficient to support a maximum sustainable yield of 20 to 60 t and 88 to 118 t, sufficient to support only about 14 alia fishing craft operating on a full-time basis. It is known that other areas of banks and reefs lie within Samoa's EEZ, but the potential productivity and ultimate profitability of fishing these areas is not known. Fishing of these stocks is currently at a low level.

The development of the small-scale tuna longline fishery has resulted in dramatic increases in overall fisheries production in recent years. Commercial production is now about 5,000 t annually from about 154 vessels. The fishing effort has increased more than the number of vessels would suggest, due to both larger vessels and more hooks being set by each vessel. Recent studies suggest a decrease in longline catch rates during the 1990s. It is thought that this reduction is from gear interaction in the Samoa zone, rather than any impact of fishing on the region-wide resources of albacore and yellowfin. Fisheries officials in Samoa have concluded that without some form of effort restriction, the profitability of the Samoa tuna fishery will continue to decrease. For this reason, the government placed restrictions on the numbers of longline vessels. As of January 2001 there has been a limit of 55 longliners over 10 m.

With respect to aquaculture, any assessment of the potential in Samoa should be viewed in the context of past aquaculture experience. The most recent assessment of aquaculture in Samoa suggested that the culture of Pacific oysters and green mussels, and the introduction of trochus offer the most promise.

INSTITUTIONAL ARRANGEMENTS

The main legislative instrument relating to fisheries in Western Samoa is the Fisheries Act of 1988. This controls the operation of both domestic and foreign fishing vessels. The stated purposes of the Act include the conservation, management and development of marine resources, the promotion of marine scientific research and the protection and preservation of the marine environment. An important provision of the Act is that the Director responsible for fisheries "may, in consultation with fishermen, industry and village representatives, prepare and promulgate by-laws not inconsistent with this Act for the conservation and management of fisheries". Using this provision, many villages now have by-laws to assist in managing their fishing grounds.

Samoa's Constitution has important implications for fisheries. Under Article 104 of Constitution, all land lying below the line of high water is vested in the State and therefore legally all Samoans have equal access to coastal resources. In practical terms, the village by-laws apply equally to village residents and outsiders and no Samoans can be differentially excluded from fishery areas.

Fisheries Fishing Licence Regulations 2001 were approved in August 2001. These regulations deal with applying for a fishing license, the number of fishing licenses available, special considerations for local/foreign license applications, transferability of licenses, offenses, and penalties.

Other legislation relevant to fisheries includes the Territorial Sea Act of 1971, the Exclusive Economic Zone Act of 1988, the Fisheries Regulations 1996, and the Fisheries Amendment Act 1999. The latter deals mainly with the licensing

requirements for local/foreign vessels, aquaculture operations, and fish processing establishments.

Responsibility for fisheries and marine resource matters is vested in the Fisheries Division of the Department of Agriculture, Forests, Fisheries and Meteorology (MAFFM). The Division, which is based in the capital of Apia on the island of Upolu, is headed by an Assistant Director (Fisheries) and employs about 35 staff organised into three main sections: Fisheries Assessment and Management Support, Community Fisheries Support, and Commercial Fisheries Support.

INTERNATIONAL ISSUES

The Fisheries Division maintains direct contact on technical issues with regional and international organisations dealing in fisheries. Policy and other matters are managed in the first instance through the Department of Foreign Affairs. Samoa is a member of the South Pacific Commission (SPC), the South Pacific Forum Fisheries Agency (FFA) and the South Pacific Regional Environmental Programme (SPREP), which is headquartered in Apia. Samoa is also party to a number of treaties and agreements relating to the management of regional fisheries, including:

- the Treaty on Fisheries Between the Governments of Certain Pacific Island States and the Government of the United States of America;
- the Convention for the Prohibition of Fishing with Long Driftnets in the South Pacific; and
- the Niue Treaty on Cooperation in Fisheries Surveillance and Law Enforcement in the South Pacific Region.

Samoa is a signatory to the United Nations Convention on the Law of the Sea (UNCLOS), the Agreement for the Implementation of the Provisions of the United Nations Convention of the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and the Convention on the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean.

RESEARCH AND TRAINING

Primary responsibility for research activity lies with the Fisheries Assessment and Management Support Section of the Fisheries Division. In the past the Division's research was largely focused on supporting development projects under implementation or consideration. In recent years there has been a re-orientation to research in support of fisheries management, especially providing information for village-level management. This has recently included the identification of areas suitable for fish reserves under the Village Fisheries Extension Programme and providing assistance in monitoring the effects of the reserves.

There is also an active tuna research programme which collects catch and effort data from the locally-based longliners. This information is analyzed by the Fisheries Division and by the Oceanic Fisheries Programme of the SPC in New Caledonia.

Other work has included the monitoring of tilapia ponds to determine growth rates and other parameters, aquaculture trials with *Macrobrachium* prawns and green mussels (*Perna viridis*), exploratory fishing trials, and experimental post-harvest product development work. *Trochus* shells (*Trochus niloticus*) have been introduced in small numbers (batches of 40 and 78 shells, both in 1990) in an attempt to support the ultimate development of a new small-scale fishery for this species. Surveys have been conducted to identify suitable reef habitats prior to the introduction of green snail (*Turbo marmoratus*).

Fisheries Division staff attended about 50 local workshops and training sessions in 1999/2000. In addition the Division benefits from overseas training opportunities provided by regional organisations or bilateral and multilateral donors. During 1999/00 Division staff attended training courses fisheries extension, aquaculture, seaweed farming, marine conservation, women in fisheries management, and coastal fisheries management. This training was variously provided by SPC, FAO, FFA, the Government of Korea, and the Government of Japan.

AID

The largest fisheries-related programme in Samoa in recent years has been the Australian-funded Samoa Fisheries Project. The project had major involvement in the promotion of management of coastal resources by adjacent communities and of conventional management of offshore fishing. A re-orientation of the Fisheries Division to being more focused on the fisheries stakeholders was a major achievement.

Bilateral programmes of technical cooperation, collaboration and assistance have been provided by the Governments of Japan, Australia, New Zealand, United Kingdom, and USA, and by multilateral donors including UNDP, FAO and UNCDF. Samoa also enjoys technical assistance or the channeling of multilateral donor assistance from various regional agencies including, FFA, SPC, and SOPAC.

There have been a number of other fisheries technical assistance projects in Samoa. The major past efforts have included the following:

- DANIDA financed the FAO/DANIDA Village Fisheries Development Project and provided a naval architect for the design of the original alia catamaran.
- FAO/ UNDP through a regional project provided support for FAD projects, baitfish culture trials, and other support.
- Japanese aid supplied a fisheries centre, fish markets and wharf.
- USAID provided a 20 m research vessel in 1988.
- FAO has assisted the development of mussel and tilapia farming.

The major aid-funded fisheries project in the near future will be the fisheries wharf complex funded by China. Construction is expected to begin in November 2002.

INTERNET LINKS

The following websites have information relevant to fisheries in Samoa:

- <http://www.spc.int/coastfish/Countries/Samoa> - Information on Samoa fisheries and links to other sites concerning Samoa
- <http://www.fishing.ws> - Information about fishing in Samoa
- <http://www.visitsamoa.ws> - General information about Samoa
- <http://www.divesamoa.ws> - Information about diving and fishing in Samoa

1

Average 1999 rate of exchange: US\$ 1.00 = Samoan dollar (S\$) \$3.0231; 2000 - 3.2864

2

Source: South Pacific Commission Statistical Summary 2000.

3

Source: South Pacific Commission 1999 mid-year estimate.

4

Source for GDP data: Gillett and Lightfoot (2001). The Contribution of Fisheries to the Economies of Pacific Island Countries. Asian Development Bank, Manila.

5

Source: government and non-government data in Gillett and Lightfoot (2001).

6

A further 3,000 people from Samoa are employed at the two tuna canneries in American Samoa.

7

Value breakdown: Subsistence US\$7,143,000; coastal commercial US\$6,583,000; Offshore locally-based US\$9,840,000; total US\$23,566,000. Not included in the total is the value of the offshore catch by foreign based vessels, US\$99,000.

8

Source for output value and trade: Government and non-government data in Gillett and Lightfoot (2001).

