

**FISHERIES DIVISION**  
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**MINISTRY OF AGRICULTURE, FORESTS, FISHERIES  
& METEOROLOGY**

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## HIGHLIGHTS

- Eleven (11) new village tilapia fish farms and 21 giant clam farms have been established in 1997/98 to promote alternative sources of food and to provide measures to enhance and manage Samoa's inshore fisheries resources. At present a total of 22 fish farms and 34 giant clam farms have been established in Samoa.
- A total of about 8,000 fingerlings, juveniles and adult tilapia have already been introduced in several locations around Upolu and Savaii in 1997/98. Moreso, 8,000 baby clams of various kinds have also been given out to villages for farming in 1997/98.
- About 394.5 mt of fishery resources valued at around SAT \$2.1 millions were landed and sold at domestic markets in 1997/98 period. Offshore tuna accounted for about 70% of the total domestic landings.
- An estimate total export in 1997/98 was around 2,208.6 mt and valued at around SAT \$19.3 millions. Tunas dominated (97%) the total fish exports. Fishery items exported for *faaos* was estimated to be around 10.4 mt. Exported dried sea cucumbers and aquarium items fetched a total value of around SAT \$55 thousands.
- The overall fisheries production (subsistence, artisanal and commercial) from Samoa waters during the 1997/98 period was estimated to be around 7,013.6 mt which valued around SAT \$39 millions. Artisanal and commercial production was estimated to be about 2,623.6 mt and worth about SAT \$21.5 millions.
- A total of 46 marine reserves have been declared in Samoa with 16 of the MPAs have been established in 1997/98 to rehabilitate Samoa's inshore fishery resources.
- At the end of June 1998, the Fisheries extension process has been commenced in more than 50 villages. Twenty-eight (28) villages were approached in 1997/98 period, but only 18 have managed to produce management plans. 16 villages have submitted their by-laws related to their management plans to the Attorney General for approval.
- Despite all the effort to instituted necessary means to improve safety while fishing, there were 21 lives have been lost at sea as a negative result of the meteoric development in the offshore longline fishery. A joint effort by the Polynesian, MOT, Fisheries Division and Police Department was set up to curb the arising problem.
- Several workshops have been organised and conducted by the Division to address issues on safety at sea, fishing technology and aquaculture maintenance in 1997/98.
- A total of about 220 motorised fishing *alias* were actively engaged in the offshore fishery in 1997/98 with about 90% of the *alias* were involved in the tuna longline fishery. A total of about SAT \$387.2 thousands worth of fuels that has been subsidised by the Government through its Fuel Rebate Scheme throughout the year.

- The Fish Market collected around SAT \$54.4 thousands of revenues in 1997/98 period.

## PROGRAMMES

### 1. AQUACULTURE

Aquaculture activities have been initiated in Samoa with objectives such as

- To alleviate pressure on over-exploited inshore reef and lagoon fishery;
- To create an additional/alternative source of food and income;
- To increase fish production.

The 1997/98 aquaculture development was based on the culturing of a fast growing species of tilapia, *Tilapia niloticus* and several species of giant clams namely *Tridacna derasa*, *T.squamosa*, *T.maxima* and *Hippopus hippopus*, and the farming of grey mullets, *Mugil* sp.

#### 1.1 Tilapia fish farms

Accordingly, palatability studies conducted by the Fisheries Division in 1995 and 1996 have indicated tilapia to be acceptable to Samoan taste preference. Since last fiscal period, it was reported that there were only three fish farms operated on constructed ponds and eight village natural freshwater ponds have stocked with tilapia. However, at the end of the 1997/98 period, there were 15 locations have been stocked with *Oreochromis niloticus*. Of the 15 established tilapia fish farms, 12 village natural freshwater ponds, streams and lakes were stocked with tilapia and five farms of constructed earth ponds were either initially stocked or restocked.

##### 1.1.1 Fish farms based on constructed earth water ponds

Chanel College, Letogo and Lotofaga fish farms were in operation since 1996. The existing fish ponds were ranged from 300 m<sup>2</sup> to 1,000 m<sup>2</sup> in sizes and details of each farm were previously reported in the 1996/97 Annual Report. Letogo and Lotofaga fish farms were ceased to operate at the beginning of the period due to poor management by owners. The Chanel fish farm was inoperative at the end of 1997/98 because of the drying up of the Moamoa river system. The ENSO has significantly impacted on the weather component of the Pacific region in which causes long period without rains. However, the Chanel fish farm is anticipated to be restocking immediately if the water supply will be sufficiently adequate.

The Fasitootai community converted a long unused community bathing pool as a fish pond with technical assistance provided by the Research Section of the Division. Similarly, the Research Section of the Division was also assisted in the construction and the establishment of the Sapapalii fish farm. The community operates both farms with both the *matais* and women committees are involved in the daily operation and the general maintenance. Sizes of grow-out ponds, establishing date and stocking density of the two new farms are presented in Table 1.

*Table 1. Summary of pond, stocking density and other related details*

	Sapapalii	Fasitootai
Establishing date	16/4/98	
Pond size	600 m <sup>2</sup>	400 m <sup>2</sup>
Stocking	1000	250
Operate by	Village committee	Village committee

### 1.1.2 Community fish farms

Village tilapia aquaculture was continued to develop throughout the 1997/98 with 20 location on Upolu and Savaii being stocked with tilapia provided by the Fisheries Division. A total of about 8,093 fingerlings and fry of various sizes have been introduced into 11 locations during 1997/98 period as summarised in Table 2. Overall, the FD has provided about 20,000 fingerlings, fry and juveniles for tilapia aquaculture development in Samoa over the past three years.

Through requests from communities, the FD continued to assess and monitor pond status, restocking and assisted in the harvesting activities on a relatively irregularly and mostly through demands basis. Appropriate recommendations pertaining to the development of the tilapia aquaculture in selected sites are relayed to the Fono upon the completion of each assessment exercise. Regular monitoring has been instigated in early 1998 due to the large numbers of villages have established tilapia fish farm. A numbers of variables are tracked, including the physical parameters, status of ponds, feeding regime, food supplies and fish health.

*Table 2. Introduction Tilapia niloticus by date and stocking density and location for the period of July 1997 to June 1998.*

Date	Location	Stocking density	Comments
30/9/97	Satoalepai	13	Stocked in a small pond. Good supplies of fish, breeding and harvested regularly of the large freshwater pond. Used by village and occasionally sold in string.
11/8/97	Fagamalo	500	Good supplies of fish, breeding and harvested regularly. Used by village and occasionally sold in string.
11/8/97	Tafua	100	Fish were released in natural ponds. Fish viable. No feeding regime. Requested assistance with plans for second pond in 1998.
21/8/97	Auala	60	Fish were put in cages.
16/9/97	Mulivai	2000	Part of the stream was fenced off and stocked with fish.
24/9/97	Poutasi	1500	Fish were released in the fenced-off part of the natural pond. Request for further assistance.
29/9/97	Asaga	900	Fish released in natural water ponds.
9/4/98	Faleapuna	1000	Fingerlings (10 cm) released into natural freshwater pond
16/4/98	Sapapalii	1000	Fingerlings (10 cm) used for stocking constructed pond
12/5/98	Saluofata	1000	Fingerlings (6 cm) used for stocking of natural freshwater pond
5/6/98	Faleapuna	20	Fingerlings (13 cm) for cage culture

Observation of village aquaculture practice indicated that regular feeding and farm management is generally poor in some areas. However, the fishery is well established in some locations after few years of stocking. With the need to address the proper maintenance of



community farms, staff of the FD has carried out ongoing maintenance workshops on existing sites. The workshop programme is summarised in Table 3.

*Table 3. Introduction and maintenance workshops*

Sites	Workshop topics
Faleapuna	Tilapia introduction workshop for community
Sapapalii	Tilapia introduction workshop for community
Saluafata	Tilapia introduction workshop for community
Poutasi	Tilapia maintenance workshops
Faala; Tafua;	Tilapia maintenance workshops
Sapapalii; Malaela	Tilapia introduction and maintenance workshops
Saleaamua	Tilapia maintenance workshops
Fasitoo-tai	Tilapia introduction and maintenance workshops

## 1.2 Village-based mullet fish farm

The aquaculture of marine species was commenced in late 1997 with a pilot feasibility study of farming the grey mullets (*Mugil sp*) at Satapuala. The Satapuala pilot farm consisted of two grow-out ponds. Currently, only one pond is stocked with fish. The pond has dimensions of approximately 60 by 30 m. Natural tidal flow facilitates flushing of nutrients. The Fisheries Division has been involved in a regular restocking (Table 4) and monitoring programs. It is planned that the second pond will be stocked with mullets before the end of 1998.

*Table 4. Introduction of marine fish, Mugil sp.*

Introduction date	n	Mean fingerling size
13/1/98	30	8.27 cm
3/2/98	70	7.13 cm
11/2/98	26	8.5 cm
8/6/98	30	10.3 cm
17/6/98	68	8.5 cm

### Future Activities

- Continue advising potential aquaculture farmers and communities on various farming systems including species and site selections and farm general management.
- Conduct site selection for the translocation of green snail and trochus species
- Establish a hatchery off Apia to produce fingerlings of tilapia, seedlings of giant clams and other aquatic species for farming and stock enhancement purposes
- Continue monitoring, collecting and collating information on growth, mortality, environmental, physical parameters, general maintenance and status of farms.
- Continue providing technical supports and advises on farm management, stocking and harvesting aspects and maintenance.
- Continue analysis of parameters collected to determine technicality and economics of these ventures.
- Further promote tilapia in the most suitable means as alternative source of food and income for subsistence communities.

### 1.3 Giant clam village farms

At present, a total of 34 Village Fish Reserves (Manono 5 villages, Upolu, 21 villages and Savaii, 11 villages) were stocked with *faisua* of various types; *Tridacna derasa*, *T. squamosa*, *T. maxima* and *Hippopus hippopus*, to form an undisturbed breeding populations. The number of clams supplied to different village varied over time, dependant on clam availability at the Fisheries Division. At the time of introduction, clams were placed in predator-avoid encased plastic trays with small stone substrate base. Two clam trays are marked for growth monitoring exercise. In the case of clams being fairly large, they are placed on the floor, thus facilitating comparison of growth and mortality rates with encased clams.

The Fisheries Division research team currently monitors village clam farm once per month to record growth and mortality data. Accordingly, the mean growth rate for Samoa is 4.2 mm per month. This is consistent with rates reported for other Pacific localities. Munro (1993) reported mean shell length changes of 5.3 cm in *T. derasa* between their first and second years of growth, in Palau, Tonga and Fiji, correspondingly to a mean monthly growth rate of 4.4 mm. Growth rates, also range widely from 1.51 mm/month to 9.37 mm/month. Additionally, the mean rate for the three island is different, (Manono 3.7, Upolu 4.4 and Savaii 4.9 mm/month). This variability may relate to a number of factors including water quality, intensity of predation, exposure to sunlight and/or size at introduction and the level of clam maintenance.

The mean mortality rate for Samoan sites is 45%. However, some areas have no remaining clams. In some instances this has been due to theft. Respective Village Fisheries Management

Committees have imposed heavy penalties on the miscreants. Other losses have been attributed to inclement weather conditions and predation by snails and octopuses

The summary of the initial stock level and the mean growth rate of clams for Manono, Upolu and Savaii for 1997/98 period are presented in Table 5 and 6. Over the past three years, a total of about 32,453 baby and juvenile *faisuas* were distributed among the 34 village fish reserves. At the end of July 1998, about 39% of the total clams were still viable with some has attained between 19-20 cm in shell length.

**Future Activities**

- Continue advising villages or communities on various monitoring and maintenance systems to ensure minimum mortality rate.
- Continue collecting scientific data on mariculture trials of giant clams to test their viability for information of giant clam farmers.
- Established breeding facilities (hatchery) for giant clams and other marine organism at an off-Apia location to provide seedlings for both culture and re-population programs.
- Analysis of parameters to determine technicality and economics of these ventures.
- Assist in provision of technical advice for establishment of giant clam farm.
- Continue site selection to assess suitable location for tilapia and giant clams.

*Table 5. Summary by introduction dates, initials stocks and mean growth rates of clams cultured in village fish reserves on Upolu during the 1997/98 period.*

Intro date	N	Location	x length (mm), tag-1	x growth rate (mm/mth) tag-1	x length (mm), tag-2	x growth rate (mm/mth) tag-2
8/8/97	1200	Fusi, Safata	96.9	3.10	97.6	3.32
8/8/97	1200	Tafitoala	76.4	5.18	100.1	2.91
11/8/97	1200	Salua-uta	82.1	3.56	112.7	3.51
14/8/97	800	Nofoalii	79.7	3.92	73.7	3.56
14/8/97	800	Fasitoo-uta	67.8	5.10	98.3	3.80
15/8/97	700	Gagaifo, Lefaga	86.1	2.51	85.7	4.54
18/8/97	500	Satitua	82.8	6.88	50.3	9.27
18/8/97	610	Mutiatele	86.8	3.40	66.9	3.26
18/8/97	700	Lotopue	95.6	3.92	64.0	3.34
19/8/97	700	Malaela	52.0	4.23	83.0	3.10
22/8/97	500	Fausaga	85.1	3.50	48.7	6.0
22/8/97	500	Poutasi	72.1	6.55	92.4	5.14
03/9/97	500	Ulutogia	47.2	5.75	88.6	3.80
03/9/97	580	Mulivai, Safata	48.5	4.95	90.1	3.65

17/10/97	500	Satapuala	98.8	3.85	62.7	6.4
20/11/97	500	Saanapu	57.1	4.3	103.2	3.4
14/01/98	500	Matafa'a	104.7	1.5	86.9	6.4
04/02/98	500	Safaatoa	59.8	6.3	114.8	2.8
9/04/98	100	Faleapuna				
22/4/98	100	Faleu-uta				
12/5/98	120	Saoluafata				

Table 6. Summary by introduction date, initial stocks and means growth rates of clams cultured in village fish reserves on Savaii during the 1997/98 period.

Intro date	N	Location	x length (mm), tag-1	x growth rate (mm/mth)tag-1	x length (mm), tag-2	x growth rate (mm/mth)tag-2
21/7/97	1500	Satoalepai	72.8*	6.5		
21/7/97	1500	Saleaula	65.9*	6.0		
14/8/97	850	Puapua	71.6*	4.6		
14/8/97	850	Fagamalo	67.4*	3.43	61.6	5.12
19/8/97	500	Fagasa	64.1*	Na		
19/8/97	500	Auala	69.2*	3.2		
22/8/97	500	Faala	80.8*	4.6		
26/8/97	500	Asau	93.4*	4.8		
26/8/97	500	Falealupo				
4/11/97	500	Vaitoomuli	62.4*	6.2		

\* mean of one tagged tray available.

#### 1.4 Other aquaculture and mariculture future activities

- Determine potential and suitable site for the release of trochus and green snail.
- Conduct mariculture trials for *Euchema* and *Caulerpa* seaweeds (*limu-fuafua*).
- Conduct trial of translocation of commonly utilised shoreline shellfish (*pae*, *asi*, *tugane* and *pipi*).

## 2. FISHERIES STATISTICS

The collection of fisheries landing statistics is vitally important for monitoring of fisheries status over time as well as facilitating the identification of appropriate and practical measures needs to manage Samoa's fishery resources. The data collection activity is an on-going program whereby surveys and assessment of fishery landings are conducted on randomly chosen days of the week at various outlets, (i.e. Fish market, retailers, ports, etc.). Basically, major taxa (families to species) of fishes and invertebrates are identified and recorded. The lengths and weights were measured and weighed with numbers being counted to determine the proportion of species composition during each sampling day. The weights are then estimated from lengths, using both a table of weight/length relationship of various types of fishes produced for similar studies in Fiji and fish and invertebrates gathered locally.

Additional information concerning economic values and fishing efforts (fishing hours, location, fuel consumption, number of crew, fishing methods, etc.) were also obtained from interviewing of sellers, proprietors and vendors. A central database system has been developed using ACCESS to accommodate all data and information gathered from the on-going sampling programme. Data are entered on a daily basis and analysis to generate monthly and annually summaries and reports.

Fisheries data and related information were collected through the following sampling programs in 1997/98 period as similar to previous years:

- (a) Offshore tuna fishery survey.
- (b) Offshore bottomfish fishery survey.
- (c) Inshore fishery survey.
- (d) Apolima landing site survey.
- (e) Wholesalers, retailers, restaurant survey.
- (f) Shellfish survey (Apia to Vaiusu).
- (g) Longline port sampling
- (h) Fugalei market fisheries survey

## 2.1 Estimating Samoa's annual fisheries production

Historically, fish and invertebrates from the sea are relatively important protein source in the diet of many coastal communities in Samoa. Likewise, these fishery items also provide the primary source of income for individuals and households in many coastal villages. Recent studies (Zann 1991; Mulipola 1997) have indicated that approximately between 35% and 40% of all households in Samoa are classified as subsistence fishers with only 12% is categorised as primary fishers. However, subsistence fishers are known to have engaged in some income generation through fishing as dictated by monetary demands for socio-economic needs.

In an effort to provide the best estimates of fishery catches and applied fishing efforts in Samoa annually, the FD has instituted an on-going sampling program whereby fisheries are sampled continuously and periodically. Data are mostly acquired from samplings of artisanal and commercial fishing activities on an on-going basis and the subsistence fishery is surveyed periodically, at every 5-6 years period. The acquiring data is subsequently use to generate the total estimates of fishery production from Samoa's fishery waters every year.

The fisheries in Samoa can be divided into subsistence (village-level) fisheries and commercial (artisanal) fisheries. Furthermore, the commercial / artisanal fisheries are separated into inshore fish (parrotfish, surgeonfish, etc.), bottomfish (mainly deepwater snappers, emperors, etc.), pelagic non-tuna fish (dolphinfish, marlin, etc.), and pelagic tuna (albacore, yellowfin, etc.).

Accordingly, artisanal fishers were people whom predominantly fish for income and barter exchange, but also retain part of their catch for consumption. However, commercial fishers were those who report predominantly selling all of their catch from all fishing trips

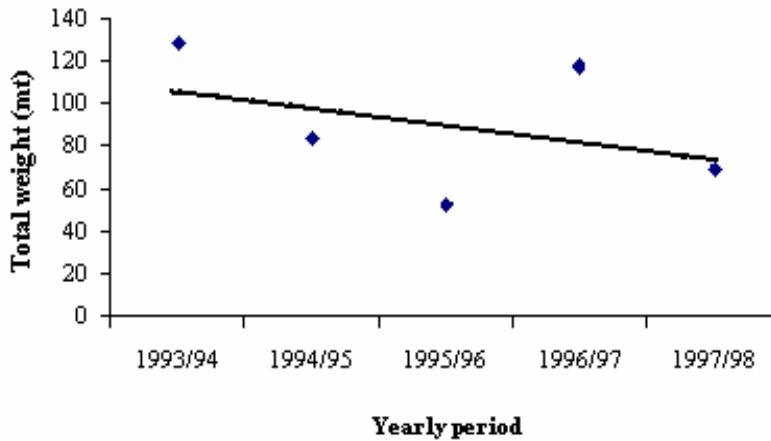
undertaken. The subsistence fishers were those fishing predominantly (ca 100%) for home consumption.

**2.1.1 Inshore fisheries**

Generally, the annual inshore fishery landings seem steadily decreased since 1992 (Figure 1). The steadiness may reflect a possibility of resources regeneration and habitats recovery since the impacts of Ofa and Valerie cyclones. Accordingly, many coral reefs around Upolu and Savaii have recovered remarkably well from cyclone effects (Green 1996).

However, the total landings for 1997/98 period was lowered significantly if compares to the total volume of inshore fishery in 1996/97 period. The increase in volume in 1996/97 may be attributed the increase in exports and the consequential shifting of efforts from agricultural activities unto fishing.

The decline in landings for 1997/98 was due primarily to significant and dramatic impact of the El Nino on major reef ecosystems around the world included Samoa. Mass coral bleaching was apparently during the period as a direct result of high sea temperature and extremely low tide experienced at the time. Consequently, these effects may probably caused reduction in many reef and lagoon stock sand therefore affected landing catches.



*Figure 1. Estimated landings (based on artisanal and commercial landings) of inshore fisheries sold at the Apia Fish Market and Other Outlets between 1993/94 and 1997/98 period.*

**(a) Fin-fish**

Reef and lagoon finfish continued to be the dominant type of inshore fishery products sold through domestic outlets throughout the year. Finfish is accounted for about 65% of the total domestic inshore landing volume in 1997/98. However, this figure represented only those were sold mostly in unprocessed forms and was able to quantified from the on-going fish market and roadsides samplings. The total value of inshore finfish landed and sold at local outlets (Fish markets and roadsides) was close to SAT\$300,000.

The added value items (cooked and processed) were sold mostly at the Fugalei market and these items were difficult to quantify because mostly were either in chopped-up or in mixed forms. The added value items has a value of around SAT\$80,000. Over the twelve months period, the overall total value of inshore finfish landed and sold via domestic outlets was about SAT \$379,000.

With regards to composition, again, the grey mullet (*anae*) (20.7%), parrotfish (*fuga*) (14.8%), emperorfish (*mataeleele*) (13.1%) and the unicornfish (*ume*) (18.1%) were the dominant fish groups in 1997/98 as similar to the 1996/97. Surgeonfish (*alogo, pone*), although the most common finfish group that sold in local markets, but only constituted about 9.9%. Stringed moray eel (5.1%) and trevally (*malauli*) (4.2%) were also the second common finfish groups that commercially sold in domestic outlets. On average, finfish was sold at an average price of \$5.50/kg throughout the year,. The summary of the total landings per major finfish group is presented in Table 7.

*Table 7. Summary of the total inshore landing by species, weights and value for 1997/98 recorded from the Apia Fish Market and Other Outlets (Fugalei, Retailers, Roadsides, etc.)*

Fin-fish major groups	Tot Wt (kg)	Tot Value (Tala)	1997/98 Wt (%)	1996/97 Wt (%)
Bigeye scad ( <i>Atule</i> )	877.05	5,086.89	1.7	0.9
Emperors ( <i>Mataeleele, Filoa</i> )	6,706.85	38,899.73	13.1	11.2
Goatfish ( <i>Ululaoa, Vete, Taulaia</i> )	1,238.19	7,181.49	2.4	2.6
Groupers ( <i>Gatala, Ataata, Papa</i> )	1,341.37	7,779.95	2.6	2.4
Milkfish ( <i>Ava</i> )	154.77	897.69	0.3	-
Mojarras ( <i>Matu, Mumu</i> )	154.77	897.69	0.3	-
Moray eel ( <i>Pusigatala</i> )	2,631.15	15,260.67	5.1	5.6
Mulletts ( <i>Anae</i> )	10,679.37	61,940.35	20.7	29.4
Other fish ( <i>Isi i'a</i> )	722.28	4,189.20	1.4	1.5
Parrotfish ( <i>Fuga</i> )	7,635.49	44,285.85	14.8	15
Rabbitfish ( <i>Lo, Malava</i> )	619.09	3,590.74	1.2	1.0
Snappers ( <i>Malai, Tamala</i> )	773.87	4,488.43	1.5	1.8
Soldierfish ( <i>Malau</i> )	773.87	4,488.43	1.5	1.5
Surgeonfish ( <i>Alogo, Pone, Palagi</i> )	5,107.52	29,623.64	9.9	6.7
Topsail drummer ( <i>Ganue</i> )	361.14	2,094.60	0.7	1.2
Trevally ( <i>Malauli, Lupo</i> )	2,166.83	12,567.61	4.2	3.5
Unicornis ( <i>Ume</i> )	9,286.41	53,861.17	18.1	15.1
Wrasses ( <i>Sugale</i> )	361.14	2,094.60	0.7	0.7
Added value fish ( <i>Afi-i'a</i> )*	3,388 bundles	33,880.00		
Added value moray eel ( <i>Fai-i-pusi</i> )*	4,577 bundles	45,770.00		
<b>Total</b>	<b>51,591.16</b>	<b>378,878.73</b>		

\* Processed and cooked fish and moray-eels wrapped in leaves were sold via Fugalei Market.

*(b) Crustacean*

The *panilurus* lobster (*ulasami*) (33.5%) and the *scylla* mudcrab (*paalimago*) (57.2%) were the two major groups of crustacean dominating the total landings of crustaceans that were disposed locally in 1997/98. About 11.6 mt was landed mostly at the Apia Fish Market and around 1,363 pieces of added value crabs and lobsters were sold via the Fugalei Market. The total volume of crustacean landed this year was lowered by about 25% than the domestic volume for 1996/97. As mentioned, the impact induced by the El Nino phenomenon may attribute to the decline in catches. Throughout the year, crustacean items were sold at an average rate of about \$8.20 tala/kg at the Apia Fish Market and \$5/piece at the Fugalei Market. A total revenue of approximately SAT\$100 thousands was generated. The summary of the total volume of crustacean by major groups is given in Table 8.

*Table 8. Estimated total landings of crustacean by major species landed at the Apia Fish Market and Other Outlets (Fugalei, Retailers, Roadside, etc.) in 1997/98*

Species	Total Wt (kg)	Total Value (Tala)	1997/98 Wt (%)	1996/97 Wt (%)
Lobsters ( <i>Ulasami</i> )	3,870.5	30,964.32	33.5	12.6
Mud crabs ( <i>Paalimago</i> )	6,608.8	52,870.42	57.2	84.8
Reef crabs ( <i>Kuku</i> )	820.3	6,562.59	7.1	2.2
Slipper lobsters ( <i>Papata</i> )	208.0	1,663.75	1.8	0.4
Other crabs ( <i>Isi paa</i> )	46.2	369.72	0.4	-
Cooked crabs ( <i>Paa vela</i> )*	-	8,178.00	-	-
<b>Total</b>	<b>11,553.9</b>	<b>100,608.8</b>		

\*Cooked crabs are sold at the Fugalei market per pieces.

*(c) Shellfish*

Once again, *faisua* and *tugane* were the dominant types of shellfish landed at domestic outlets in 1997/98. Both items were accounted for about 80% of the total revenues produced. Most of the shellfish products were sold either in single piece of larger items and in bags or basket of smaller size items. In some cases, bivalves were processed and sold in bottles or containers and were traded for an average prices of SAT\$5/bag or \$6/bottle. Based on these average unit costs, about SAT \$40,000 of revenues was generated from locally disposed shellfish. Table 9 presented the summary of domestic landings of major bivalve types.

*Table 9. Total volume of main shellfish types landed and sold at the Apia Fish Market and Other Outlets (Fugalei, Retailers, Roadside, etc.) in 1997/98*

Species	Total Wt (kg)	Total Value (Tala)	1997/98 Wt (%)	1996/97 Wt (%)
Giant clams ( <i>faisua</i> )	1,556.6	18,678.71	97	100
Other bivalves	25.7	308.10	1.6	
Bottled items ( <i>fole/fatuau/tio</i> )*	1,287 bottles	7,722.00		
Cockle ( <i>asi, tugane</i> etc)*	2,660 bags	13,300.00	1.4	



<i>Total</i>	<i>1,582.3 kg</i>	<i>40,008.81</i>
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*\*Processed items sold through the Fugalei Market*

*(d) mollusc*

Octopus (*fee*) again remained the primary type of mollusc that was sold unprocessed (14.7 mt) via the Apia fish Market and generated about SAT \$65.5 thousands in total revenues. Bigger sizes octopus were normally sold individually whereas small ones were generally stringed. On average, octopus was traded at about SAT \$4.4/kg. The summary of major types of mollusc landed and sold locally is presented in Table 10.

*Table 10. Total volume of mollusc by species landed at the Apia Fish Market and Other Outlets (Fugalei, Retailers, Roadside, etc.) in 1997/98*

<i>Mollusc species</i>	<i>Tot Wt (kg)</i>	<i>Tot Value (Tala)</i>	<i>1997/98 Wt (%)</i>	<i>1996/97 Wt (%)</i>
Octopus ( <i>fee</i> )	14,695.1	65,393.00	99.0	91
Other mollusc	29.7	132.11	1.0	9
<i>Total</i>	<i>14,724.8</i>	<i>65,525.11</i>		

*(e) Processed fishery products*

Locally harvested invertebrates and shellfishes were sold predominantly in processed and cooked traditional added-value means. Normally, the processed items were in bundles, bottles, plastic bags and baskets. Often, the added-value means involves the trading of items in whole, partial and mixed forms. The local trading of processed invertebrates and shellfishes yielded more than SAT \$360,000 in incomes. The bottled *sea* (digestive tract of *stichopus horrenis*) is accounted for about 34% of the total incomes produced. Table 11 provided the summary of processed invertebrates and shellfishes that were traded via Fugalei Market in 1997/98.

*Table 11. Total volumes of invertebrates sold in processed and cooked forms at Fugalei Market in 1997/98.*

<i>Fishery Products</i>	<i>Tot Qty</i>	<i>Tot Value</i>	<i>Av price</i>
Jellyfish ( <i>Ofu alualu</i> )	2,669	13,345.00	5.00
Gonads ( <i>Fagu ape</i> )	3,579	35,790.00	10.00
Sea cucumbers ( <i>Fagu fugafuga</i> )	2,712	27,120.00	10.00
Digestive of curryfish ( <i>Fagu sea</i> )	7,694	115,410.00	15.00
Lollyfish ( <i>Fagu loli</i> )	275	2,750.00	10.00
Scyloimia/Anemone ( <i>Ofu lumane/matalelei</i> )	7,634	38,170.00	5.00
Sea urchins ( <i>Sava'e</i> )	1,183	2,366.00	2.00
Sea hare ( <i>Fagu gau</i> )	3,578	21,468.00	6.00
Caulerpa/Seagrape ( <i>Ofu limu</i> )	15,965	79,825.00	5.00
	<i>45,289</i>	<i>336,244.00</i>	<i>6.80</i>

*(f) Total inshore fishery products landed and sold domestically.*

It has been estimated that about 79.45 mt of inshore fishery products was landed and traded via local domestic outlets in 1997/98. Moreso, a total of around 0.64 mt of other products either categorised as inshore or offshore types was also estimated being landed and sold locally. There was a substantial amount of inshore fishery items that was sold as processed and added-value commodities at Fugalei market. Because of the mix nature of these sold items, the total landing quantity was generally unknown. The total value of fishery products that were traded in added value during 1997/98 was estimated to be around SAT\$926 thousands. The summary of processed items by group is presented in Table 12.

Table 12. Overall totals of inshore fisheries landed and sold at domestic outlets in 1997/98

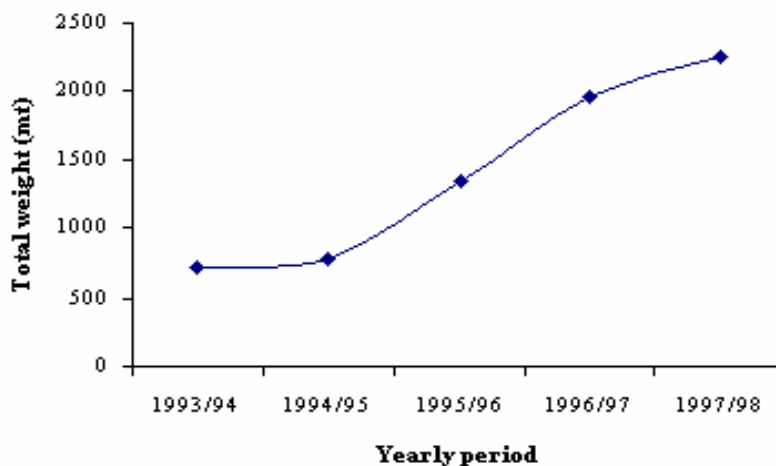
Fishery groups	Total Wt (MT)	Total Value ('000T)	Avg \$/kg
Finfish ( <i>I'a</i> )	51.60	378.88	5.80
Crustaceans ( <i>Meaola faiatigi</i> )	11.55	100.61	8.00
Molluscs ( <i>Fee, molusa</i> )	14.72	65.53	4.45
Shellfish ( <i>Figota</i> )	1.58	40.00	12.00
Processed fishery products ( <i>Isi</i> )*	-	336.24	6.80
<b>Total inshore products</b>	<b>79.45</b>	<b>921.26</b>	<b>6.18</b>
Other products	0.64	4.80	

\* Added value items were sold in whole, parts or mixed forms in bottles, wrapped-leaves, plastic bags, etc and were difficult to quantified.

### 2.1.2 Offshore fisheries

#### (a) Tuna fishery

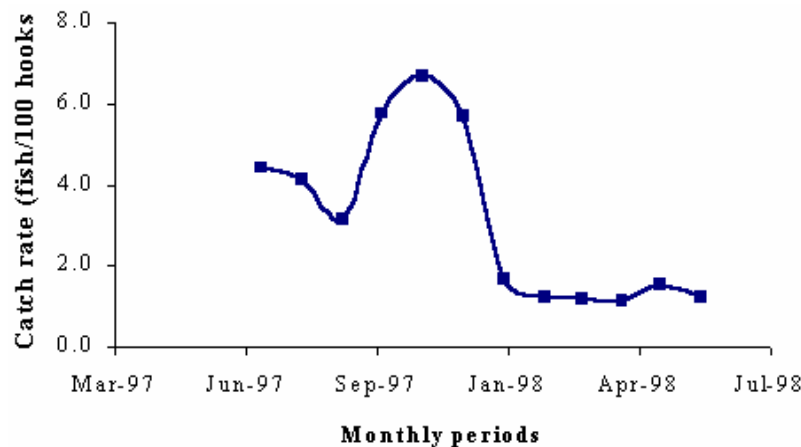
Over the past five years, catches for tuna species has continued to increase (Figure 2) significantly. The significant development of the tuna longline fishery saw many locals and foreign interests entered the fishery as well as acquiring bigger and higher capacity fishing vessels. The continuous increasing in landings reflected not only the significant increased in fishing powers but also the improvement of on-board and post-harvesting handling. Additional and improved export facilities were also established in which enhanced the quality of fish and therefore improved the rate and volume of fish being exported.



*Figure 2. Annual landings of offshore tuna fishery between 1993/94 and 1997/98*

The monthly catch rate for the *alia* longline fishery has varied considerably over the past twelve months ranging from 9.0 fish/100-hooks in December 1997 to 1.0 fish/100-hooks in February and May 1998. However, the annual average rate tends to be well above the reported catch rates of many large-scale longline fisheries around the Pacific region. It is reported that the normal catch rates of longline fisheries in the region are ranged between 3 and 4 fish/100 hooks. The *alia* longline fishery has an average catch rate of about 4.2 fish/100-hooks in 1997/98. The bigger locally based longline vessels have an average rate of about 3-3.6 fish/100-hooks over the same period.

The El Nino phenomenon has markedly occurred at the last six months of the year. The sea surface average temperatures have increased, hence affecting the normal distribution of tuna around the Pacific region. Generally, the catch rate for the longline fishery tend to declined around the warmer months of the year, November to April, however, the catch rate experienced during the end of 1998 has been very dramatic and low. Figure 3 illustrated the monthly general trend of catch rates of the local *alia* longline fishery.



*Figure 3. Monthly catch rates of the local longline fishery during the 1997/98 period*

Accordingly, the exploitation of the high priced tuna species: albacore (*Thunnus thunnus*), bigeye (*Thunnus alalunga*) and yellowfin (*Thunnus albacares*) provided significant economic opportunities and achievements for many locals as well as the whole country. Exports of frozen tuna and fresh chilled fish have become a top revenue earner for Samoa in recent years. Correspondingly, the industry has also provided many employment opportunities for locals directly engaged in fishing as well as indirectly involved in other related areas. For instance, there were about 220 *alias*, crewed by an average of four fishers per boat, were actively engaged

in the motorized offshore fishery in 1997/98 (see Local vessels registration section). Likewise, there were six export companies involved in the exportation of frozen and fresh chilled tuna to oversea markets.

Table 13 presented the total volume of tunas by major species in 1997/98 that were disposed and traded via domestic outlets. Skipjack tuna (*Katsuwonus pelamis*) was once again the dominant species accounting for more than 81% of the total volume. Yellowfin and albacore constituted about 15.3% and 2.4% respectively. Throughout the year, tuna fish was sold at an overall average price of about \$3.35/kg at local outlets.

*Table 13. Estimated total volume of tunas sold through local outlets (Apia Fish Market and Other Outlets) in 1997/98*

Tuna species	Tot Wt (kg)	Tot Value (Tala)	1997/98 (%) wt	1996/97 (%) wt
Skipjack ( <i>Atu</i> )	225,743.33	790,114.38	81.8	76
Yellowfin ( <i>Asiasi</i> )	42,223.41	147,784.24	15.3	18
Albacore ( <i>Apakoa</i> )	6,788.89	23,761.38	2.5	3
Bigeye tuna ( <i>Pikiai</i> )	551.97	1,931.83	0.2	2
Dogtooth tuna ( <i>Tagi</i> )	386.41	1,352.27	0.1	1
Stripped tuna ( <i>Tavalau</i> )	275.98	965.90	0.1	
<b>Total</b>	<b>275,970.00</b>	<b>965,910.00</b>		

**(b) Other non-tuna pelagic fish landings**

*Masimasi*, swordfish, marlin and wahoo were the most common by-catch species of the longline fishery. Predominantly, these fish were sold locally with a minor portion being exported to overseas markets. A total volume of about 11.43 mt of pelagic non-tuna fish was traded locally in which around SAT\$64.23 thousands of revenues was generated. *Masimasi* and wahoo accounted for 71.6% and 20.4% respectively. Larger non-tuna pelagic fish (marlins and swordfishes) were cut into pieces and sold at an average price \$5.60 tala/kg. Because of the large size of marlin and swordfish, normally these fish types were mainly sold in pieces valued at around 15-20 tala/piece. Given in Table 14 is the overall summary of non-tuna pelagic fish sold via the Apia Fish Market and other domestic outlets in 1997/98.

*Table 14. Domestic landings of other pelagic fish at Apia Fish Market and Other Outlets in 1997/98 period*

OTHER OFFSHORE PELAGICS	Total Wt (kg)	Total Value (tala)	1997/98 % wt	1996/97 % wt
Dolphinfish ( <i>Masimasi</i> )	8,183.89	45,988.67	71.6	47
Marlin/Swordfish ( <i>Sa'ula, Saulele, Malini</i> )	159.94	899.22	1.4	24
Wahoo ( <i>Pala</i> )	2,331.74	13,102.92	20.4	18
Other Pelagic Fish ( <i>O isi ituaiga ia-aluga</i> )	285.81	1,605.74	2.5	6
Rainbow runner ( <i>Samani</i> )	468.62	2,633.43	4.1	5
<b>Total</b>	<b>11,430.00</b>	<b>64,230.00</b>		

*(c) Deepwater fisheries*

With the majority of active fishing *alias* have been actively engaged in the tuna fishing industry, the yearly landings (both domestic and exports) for bottomfish fishery (Figure 4) continued to decline since 1991. However, the landing of deepwater fish was slightly improved during 1997/98 period. The improvement was probably due to the shift of some normally longline fishing *alias* to deepwater fishing during the ENSO period when they experienced very low catch rates in the tuna fishery. The ongoing increases in fishing effort for the exploitation of highly priced tunas (albacore and bigeye) will continue to sustain the level of deepwater fish species at the current minimum level.

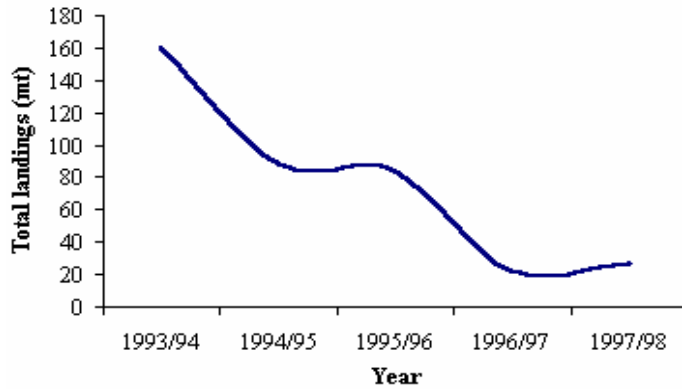


Figure 4. Offshore bottomfish sold at the Apia Fish Market and Other Outlet between 1993/1994 and 1997/98.

Close to 27 mt of deepwater fish was landed and sold through domestic outlets and subsequently generated around SAT\$150,000 of revenues. Bottomfish was traded at an average price of about SAT\$5.50 per one kilogram of weight. The *Lethrinus*, *Lutjanu gibbus* and *Pristipomoides* groups were the most common deepwater fish sold at domestic outlets and were accounted for more than 60% combined of the total volume. The summary of the annual total domestic landings by common fish groups in 1997/98 period is presented in Table 15.

Table 15. Estimated total landings of deepwater common fish species sold through Apia Fish Market and Other Outlets (Apolima) during the 1997/98 period

DEEPWATER SPECIES	Total Wt (kg)	Total Value (tala)	1997/98 % wt	1996/97 % wt
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Baracuda ( <i>Sapatu</i> )	2,445.6	13,451.05	9.04	3.6
Emperor ( <i>Filoa, Pela, Mataaleele</i> )	5,378.3	29,580.41	19.88	0.1
Grey jobfish ( <i>Utu, Asoama</i> )	898.2	4,939.99	3.32	10.0
Grouper ( <i>Gatala, Ataata</i> )	1,071.3	5,892.27	3.96	0.0
Humpback snapper ( <i>Malai</i> )	7,610.2	41,855.98	28.13	41.8
Other fish ( <i>Isi Pa</i> )	1,823.4	10,028.77	6.67	0.0
Shark ( <i>Malie</i> )	451.8	2,484.87	1.67	2.4
Silverjaw jobfish ( <i>Palusina</i> )	1,225.5	6,740.40	4.53	9.8
Snapper ( <i>Sinepa</i> )	3,592.7	19,759.95	13.28	20.4
Other snappers ( <i>Isi sinepa</i> )	1,504.1	8,272.99	5.63	
Blue striped snapper ( <i>Savane</i> )	808.9	4,448.96	2.99	
Trevally ( <i>Malauli, Tafauli</i> )	243.5	1,339.15	0.9	11.6
<b>Total</b>	<b>27,053.5</b>	<b>148,889.83</b>		

#### (d) Total offshore landings

For the total offshore fishery in 1997/98, the tuna fishery is once again dominated (88%) the domestic offshore landings. Collectively, more than 300 mt of offshore originated fishery items was landed and sold via the Apia fish market and other local outlets throughout the year. This amount generated close to SAT\$1.2 millions annually based on the local annual average price of \$5.5/kg, \$3.5/kg and \$5.62/kg for tuna, deepwater fish and non-tuna pelagic respectively. The summary of the total offshore fishery landings that were traded at local outlets is given in the table below (Table 16).

Table 16. Overall summary of offshore fisheries landed at domestic outlets in 1997/98

Fishery types	Total Wt (kg)	Total value (tala)	Avg \$/kg	1997/98 % wt	1996/97 % wt
Deepwater	27,053.50	148,889.83	5.50	9	10
Tuna	275,970.00	965,910.00	3.50	88	87
Other pelagics*	11,430.00	64,230.00	5.62	4	3
<b>Total</b>	<b>314,453.5</b>	<b>1,179,029.83</b>			

\* Billfish, swordfish, sailfish, masimasi, rainbow runner, etc.

## 2.2 Fisheries Exports

### 2.2.1 Fish

Based on records of exports documented by the Fisheries Division from their certification process and CBS/FD/Custom provisional forms, about 2,146 mt of fish and invertebrates, valued at around SAT\$12.7 millions was commercially exported in 1997/98. Furthermore, a

total of around 7.8 mt of fish and invertebrates was also shipped for *faaosu* (gift) purpose to mostly relatives and *aiga* (most items has no declared value).

Similar to last year, tuna fishery items (96.8%) again dominated the total export volumes of fisheries directed for sale purpose in 1997/98. Inshore (37%), tuna (21%) and other pelagic (39%) fisheries were the main fishery items exported for *faaosu*. For export tuna composition, the albacore tuna was once again dominating (92.8%) the total fishery exports. The yellowfin tuna constituted about 5.6% with bigeye and skipjack tunas comprised 1.4% and 0.2% respectively.

Due to the restriction of airplane freight spaces, the amount of fresh chilled tuna and other fresh fish anticipated for export to more lucrative overseas markets was kept at a minimum level. The continuous demand for fish, especially for tunas at the canneries in American Samoa thus provided a significant market opportunity for much of the local landed tunas. Approximately 88.7% of the total exports in 1997/98 were shipped to the canneries in Pagopago. The fresh chilled tunas appropriated for sashimi markets were exported primarily to the USA markets, in which constituted about 11.2% of the annual exports. Contrary, a very minor portion of exports was directed to Australia and New Zealand markets. Table 17 exhibited the total volume of fishery products exported for overseas markets between July 1997 and June 1998.

Table 17. Total fisheries exports for sale and for *faaosu* in 1997/98

GROUPS	EXPORT		FAAOSO	
	Wt(kg)	Val(tala)	Wt(kg)	Val(tala)
DEEPWATER	3,863.97	48,869.66	221.5	2,801.42
R				
INSHORE	9,646.40	99,237.00	2,924.60	32,009.69
PELAGICS	45,870.00	394,520.00	4,700.00	54,810.00
TUNAS	2,145,790.00	18,668,340.00	2,520.00	8,820.00
OTHERS	3,450.89	48,900.00	32.9	448.04
	<b>2,208,621.26</b>	<b>19,259,866.66</b>	<b>10,399.00</b>	<b>98,889.15</b>

### 2.2.2 Aquarium

The exploitation of potential fishery and marine items for the aquarium trade was restricted only to the gathering of dead corals or bio-rock (trade name). Previously exported colourful tropical fish and invertebrates were prohibited from exporting due to the promotional effort by the Government to conserve and manage Samoa's coral reef ecosystems. The exploitation of dead corals is governed by special terms and conditions envisaged for the promotion of sustainable utilisation of exploitable resources.

A local company was permitted to harvest and export 200 pieces of dead corals (12 inch by 12 inch by 12 inch in dimension) a week to USA. A total of about 3,890 pieces was air-freighted and generated roughly SAT\$33.7 thousands of revenues. A single piece of bio-rock was trade for an average of about SAT \$10.08. The monthly summary of aquarium bio-rock exported in 1997/98 is given in Table 18.

Table 18. Monthly total exports of bio-rock for the aquarium trade in 1997/98

Month	Total Pieces	Total Value(T)
November 97	400	3,660.0
December 97	490	4,483.5
January 98	400	3,660.0
February 98	400	3,660.0
March 98	400	3,660.0
April 98	400	3,660.0
May 98	400	3,600.0
June 98	800	7,320.0
<b>Total</b>	<b>3,890</b>	<b>33,703.5</b>

### 2.2.3 Bechedemer

Several types of locally occurred sea cucumbers were exploited for their thick body walls use for food and pharmaceutical purposes. Generally only few types of these organisms have utilised for local food. However, most thick-walled sea cucumbers unused for local food were harvested and processed, and exported predominantly to Hong Kong markets as beche-de-mer products in 1997/98. A total weight of about 3.35 mt was exported fetching around SAT\$15.2 thousands in revenues. Table 19 summarises the total volume of beche-de-mer per species exported in 1997/98.

Table 19. Total volume of bechedemer exported in 1997/98 period

Species	Tot Wt (kg)	Tot Value (T)
Brown sandfish	1991	7,565.8
Greenfish	287	1,808.1
Tigerfish	450	2,178.0
Black teatfish	318	2,067.0
Surf redfish	300	1,575.0
<b>Total</b>	<b>3,346</b>	<b>15,193.9</b>

## 2.3 Commercial and artisanal fishery landings

Based on estimates determined from samplings undertaken for both the commercial and artisanal fisheries, a total of about 2,614 mt of all fishery products was harvested from Samoa waters in 1997/98. The total volume of combined fishery items earned close to SAT\$21.5 millions of revenues. Of the total volume, tunas accounted for about 93% with deepwater, reef



and lagoon and non-tuna fisheries made up the remaining 7%. Moreover, about 85% of the total fishery landings was disposed predominantly as commercial exports with the domestic markets and for *fuaoso* exports accounted for about 0.4% and 15% respectively. The summary of the total fishery landings per major groups and fate of disposition for commercial and artisanal reasons is given in Table 20.

Table 20. Overall summary of fisheries commercial and artisanal landings in Samoa in 1997/98

GROUPS	EXPORT		FAAOSO		DOMESTIC		OVERALL TOTALS	
	Wt(MT)	Val(000T)	Wt(MT)	Val(000T)	Wt(MT)	Val(000T)	Tot Wt(MT)	Tot Val(000T)
DEEPWATER	3.86	48.87	0.22	2.80	27.05	148.89	31.13	200.56
INSHORE	9.65	99.24	2.92	32.01	79.45	921.26	92.02	1,052.51
PELAGICS	45.87	394.52	4.70	54.81	11.43	64.23	62.00	513.56
TUNAS	2,145.79	18,668.34	2.52	8.82	275.97	965.91	2,424.28	19,643.07
OTHERS	3.45	48.90	0.03	0.45	0.64	4.81	4.12	54.16
<b>TOTAL</b>		<b>19,259.87</b>	<b>10.39</b>	<b>98.89</b>	<b>394.54</b>	<b>2105.1</b>	<b>2,613.55</b>	<b>21,463.85</b>
	<b>2,208.62</b>							

## 2.4 Subsistence or village-level fisheries

Obtaining of subsistence estimates is relatively difficult because of the wide diversity of fishing communities and the enormous amount of effort required. Additionally, lack of manpower and resources also contributed to the complication of collecting subsistence landings. Nevertheless, the outcomes from subsistence surveys undertaken in 1990/91 on Upolu (including Manono) and 1991/92 and 1996/97 on Savaii Island were applied to generate the estimates of subsistence landings.

Based on these subsistence assessments, King (1990) estimated the subsistence landing for Samoa as 4,600 mt. Likewise, Zann (1990) and Mulipola (1997) estimated subsistence landings to be 3,200 mt in 1990 and 4,200 mt in 1996 respectively. Again, King and Faasili (1997) estimated the subsistence landing for the whole of Samoa as 4,600 mt in 1997. Based on the estimates suggested by King and Faasili (1997) and Mulipola (1996), the subsistence landing for 1997/98 is estimated to be around 4,400 mt. Given that the average cost of about \$4/kg is applied, therefore, approximately SAT\$17.6 millions is the total value estimated for the subsistence landings in 1997/98.

## 2.5 Overall total fishery production for 1997/98

The overall total fishery production from Samoa waters for 1997/98 period is generated from combining the total landings of commercial and artisanal fisheries and the subsistence estimates. A total of about 7,013.6 mt was estimated as the overall volume of fisheries with an estimated value of around SAT\$39 million was harvested and landed from Samoa's fishery waters. The summary of the overall total fishery productions vy major fishery is presented in Table 21.

Table 21. Overall estimated total fishery productions in 1997/98

Fisheries Landing Source	Estimated Total Wt (mt)	Estimated Total Value (Million Tala)
Artisanal & Commercial	2,613.6	21.46
Subsistence	4,400.0	17.60
<b>Overall Totals</b>	<b>7,013.6</b>	<b>39.06</b>

### Future activities

- Continue collecting fisheries data and related information
- Review and modify fisheries sampling programs.
- Develop new and modify existing fishery database systems with assistance provided by SPC
- Train supporting and new staff on sampling, databasing and analysis methods and techniques.
- Upgrading the databasing and analysing systems for efficient generation of reports and information.
- Impose sampling program and data collection to gather information on biological, technical, social and economical implications of the newly developed longline fishery.
- Improve a uniform export certification process in conjunction with other authorities.

## 3. RESOURCES ASSESSMENT AND MANAGEMENT

### 3.1 Fisheries reserves

The rehabilitation of Samoa's fishery resources involves the institution of fish reserves around the country as a practical and meaningful management tool. A complete ban on fishing activities is declared in the reserves, in which, the possibility of establishing a network of fish refuges around the entire country is anticipated. Objectively, the establishment of these fish reserves is to provide the means by which lagoons and adjacent fishing areas may eventually be replenished by breeding and larval transportation.

A total of 46 marine reserves have been declared in Samoa. Reserves are located between the shore and the main barrier reef and are variable in sizes. The reserves are sited around Upolu, Savaii and Manono islands. Each reserve is managed by an elected Village Fisheries Management Advisory Committee (VFMAC), comprising of *matai*, *faletua*, *tausi*, *taulelea* and *auluma*. There were 14 fish reserves declared in 1997/98. The establishment of the existing marine reserves were instituted by the authority of the Village Fono based on the technical advice provided by the Resources Assessment and Management Section (ARMS) of the Fisheries Division. The summary of declared fish reserves by location and date established in 1997/98 is given in Table 22.

Table 22. Fisheries Reserves declared during 1997/98 period

Fisheries Reserve	Declaring date
<b>UPOLU ISLAND</b>	
Mulivai, Safata	12/8/97
Ulutogia, Aleipata	12/8/97

Saanapu, Safata	10/9/97
Satapuala	7/10/97
Saleaumua, Aleipata	24/10/97
Safa'atoa, Lefaga	14/1/98
Faleapuna	23/3/98
Saoluafata	1/5/98
Faleu-uta	15/4/98
Vailoa, Aleipata	14/5/98
Solosolo	25/6/98
Fasitoo-tai	22/6/98
<b>SAVAII ISLAND</b>	
Vaito'omuli	14/11/97
Sapapalii	10/11/97

#### Future activities

- Carry out further assessment of locations suitable for the introduction and translocation of green snail (*Turbo mamorata*) and trochus (*trochus niloticus*).
- Continue to provide technical supports for the establishment of fish reserves through area profile and biodiversity assessments.
- Continue monitoring of existing reserves in conjunction with communities.
- Extend and expand coral reef monitoring program to include monitoring of areas in and outside reserves.
- Further train other communities in monitoring techniques and encourage their participation through their involvement in monitoring activities.

#### 4. FISHERMEN SAFETY AT SEA RADIO COMMUNICATION NETWORK

The establishment of the Safety at Sea Communication Network was and is mainly for the safety of the fishermen while working out in the open sea. The system allows them to communicate to shore for help if assistance is needed. The successful of the longline fishery compelled boats owners and fishermen to ignore safety precautions which, has resulted in number of incidents involving the lost of 21 lives and expensive assets over a very short period of time. The high number of incidents has become a major concern to the Fisheries due to the number of reasons such as the design of fishing boats, lack of survival equipment and the inexperience of fishermen in making decision especially during adverse weather conditions. In an attempt to promote safety and to make the fishers really aware of the safety aspects while at sea, a safety week was launched in September 1997 on a joined effort of the Fisheries Division, Ministry of Transport, Police Department, Polynesian Air Lines, Samoa Marine, and other local agencies. Talks, demonstrations and displays pertaining to sea safety were part of the awareness campaign.

Since the introduction of the Communication System, the number of fishing vessels as well as of lives lost at sea had been reduced. This was made possible through the coordination and direction of rescue missions through the system. Throughout the period a series of incidents had occurred to some fishing boats at sea and these included four fishing boats that left the Samoa waters without any trace. Most of these boats were unregistered and couldn't have

access to the established communication system or had taken no 2-way radio access of any types on board. The Police Department had contributed much through the use of the Nafanua Patrol Boat for the rescue missions that were undertaken for the distressed fishing boats and we acknowledge with gratitude their effort shown.

The misuse of the system had been observed being very frequent and therefore the matter was address through a series of meetings between the Fisheries Division and boat owners.

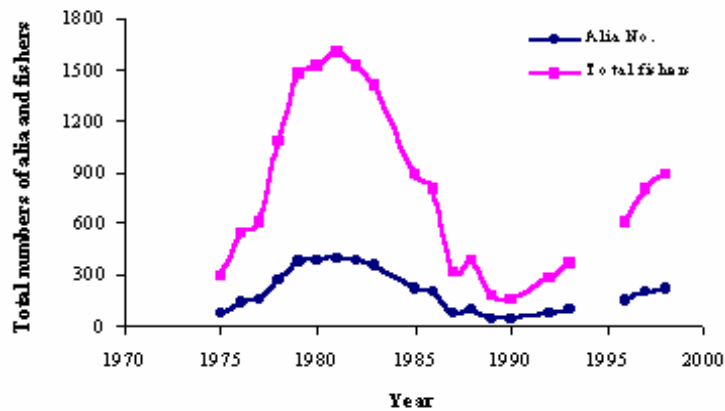
Future Activities

- Upgrade system in a way to minimize the daily misuse of the Network
- Design a system to improve the 24 hour service especially during the public holidays
- Liase with the Police and other appropriate authorities for search and rescue missions
- Arrange for a steady supply of radio units and spare batteries for the Fishermen.

**5. LOCAL FISHING VESSELS REGISTRATION**

Previously, local fishing vessels were never officially registered, however, with the meteoric development of the offshore longline fishery and the associated increasing number of fishing incidents, the Division established a registration system of local fishing boats. The registration system highlighted all safety and a survival element prior to any vessel is issued with a license to fish.

There were 220 registration applications received in 1997/98 period, however only 173 fishing *alias* were official registered and granting permit to fish. A fee of \$50.00 is charged for registration. The valid licensing period commences from 1<sup>st</sup> of July 1997 to 30<sup>th</sup> June 1998. Despite the existence of the registration system, still there is no official regulation obliging boat owners to register their vessels and requesting for fishing permission. The regulation is prepared by the MOT in conjunction with other related authorities and hopefully, it will approve by the middle of the fiscal year.



*Figure 5. Level of fishing effort (boats and fishers) employed in the motorised fishery*

During the 1997/98 period, there were 220 registered and unregistered fishing boats that were actively engaged in the motorised offshore fishery. About 90% of these vessels were involved in the tuna longline fishery with about 10% being periodically engaged in the deepwater fishery. An *alia* is manned by an average of four crew members; therefore around 880 individuals were directly involved in fishing as fishers with more people supporting other areas of the industry ranging from sellers, exporters, processors, etc. Figure 5 illustrated the trend of the yearly estimated applied fishing effort in terms of fishing boats and fishers for the motorised fishery over the past decade.

#### Future Activities

- Keep records of the local fishing vessels registration
- Liase with the Ministry of Transport regarding safety issues for the vessel registration.
- Liase with the Police Department on tracking unregistered fishing vessels

## 6. FISHERIES SURVEILLANCE AND FOREIGN FISHING VESSELS LICENSING

There had been improvements regarding the illegal fishing methods and the minimum size of fish sold since the re-enforcement of the Fisheries regulation. This was brought about with the establishment of village management plans and the enforcement of their existing by-laws, as well as by the Fish market management and the Fisheries data collectors. The Police Department had been working jointly with the Fisheries on surveillance activities both at the market places and our Exclusive Economic Zone (EEZ) through the use of the Nafanua Patrol Boat. The Australian and New Zealand Air Forces continued to assist our national Surveillance by conducting aerial surveillance missions.

Five (5) long line foreign fishing vessels were issued with fishing licenses for this licensing period. TROPAC Fishing Co. had its four fishing licenses renewed and another fishing license was issued to an American Samoa company *Faiivaimoana* Fishing Company. While Samoa still maintained membership of the Multilateral Treaty Agreement, the Regional Register recorded a total number of 166 American purse seine vessels which possess licenses to fish in certain Pacific island countries including Samoa's 200 miles exclusive economic zone.

#### Future Activities

- Cooperate with the Police Department on Surveillance activities both onshore and offshore.
- Take part in aerial surveillance.
- Liase and consult with the Forum Fisheries Agency on regional surveillance programs.
- Process fishing license for foreign fishing vessels.

## 7. EXPLORATORY FISHING

The success of the long line fishery has drawn a lot of interest not only from the private and business sectors but also from foreign investors and other countries in the region as well. Fisheries Officers and consultants from Fiji, Tonga, Cook Islands and Niue visited Fisheries on fact-finding missions in late 1997 and early 1998. Consultants from the regional organizations have been on assignments to Apia to investigate into the mystery of the Samoa's Longline fishery success.

One of the highlights with in the tuna longline development is the rapid increase in the local fleet. The registration figures showed an increase over threefold in less than two years. This rapid growth of the local fleet with new players in the industry has kept the program with regular training of new fishermen on fishing method technique and fishing gear construction. A total of 10 new crews or about 40 individuals had received training under this program.

With the Tautai Matapalapala having problems on its steering system the program was prevented from doing trial fishing in the field. The part has been ordered overseas and hopefully to put the boat back into operation when the steering is repaired. The vessel was dried dock in the last quarter of this financial year.

### Future Activities

- Trial fishing for Sashimi Market
- Provide training for fishing gear construction and fishing method demonstration and Fish handling and processing.

## 8. FISH AGGREGATING DEVICES

Although fund was provided for the purchase, construction and deployment of new FADs during this financial year, the Fisheries Division was unable to utilize it due to the prolong procedure put through the tender system in processing purchase order. Most of the components for FADs construction are not available locally so they were to be ordered from overseas. As a result, there was no deployment was made this year.

### Future Activities

- Construction, Deployment and Monitoring of one FAD.

## 9. FISHERIES ADVISORY SERVICES (Extension and Training)

The Fisheries Division Extension and Training Project (supported by AusAID) has been in operation for a total of 42 months (First phase: February 1995- February 1998 - Extension

phase: March 1998-August 1998). During this period, it has achieved the medium-term goal to prevent further decline of near-shore fisheries resources. It has also gone much of the way towards the long-term goal of improving the standard of living for Samoan fishers and their families. The project involves a community-focussed extension process and the development of alternative sources of seafood. The Fisheries Division Extension program culminates in a fisheries management plan for each of the participating villages. The plan for each village sets out the resource management and conservation undertakings of the community and the servicing and technical assistance inputs of the Fisheries Division. A summary of the process is presented in Figure 6.

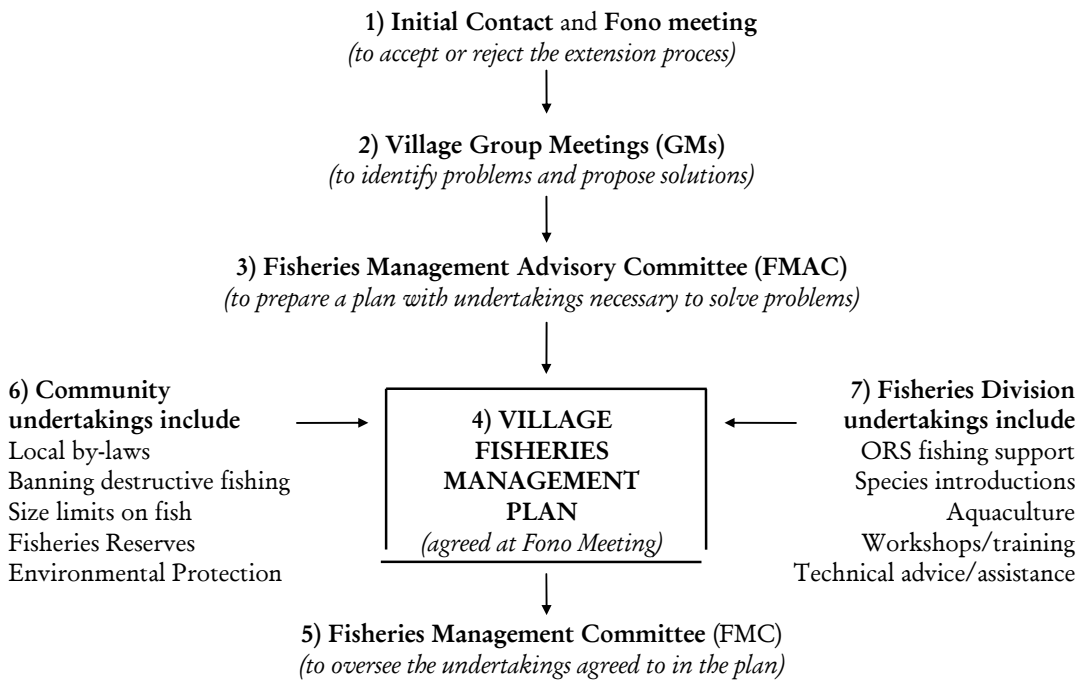


Figure 6. The Fisheries Extension Process in Samoan villages

During the period June 1997 to June 1998, extension staff in the Fisheries Division have worked hard to assist 18 new villages to produce Village Fisheries Management Plans. The plans contain a range of community undertakings designed to conserve and rebuild fish stocks and to protect the marine environment. Undertakings have differed from village to village and the most common are summarised below.

- Banning the using of dynamite and poisons to kill fish

- Banning smashing of corals to catch sheltering fish
- Minimum size limits on fish
- Banning underwater torches for spearfishing at night
- Collecting Crown of Thorns starfish
- Banning removal of beach sand and dumping of rubbish
- Establishment of fish reserves

Table 23 lists the villages contacted during the period June 1997-June 1998. A total of 28 villages were approached during this time but 10 have delayed, declined or discontinued for a variety of reasons. These have included village disputes, relocation of the village site, preference for the IUCN program, etc. A total of 16 MPAs have been declared and 16 of these have been surveyed to date. A total of 16 villages have submitted by-laws related to their Management plans, to the Attorney General for approval. To date, two of these have been signed and are in operation.

Public awareness has continued to be an important component of the work of Extension staff during this period. For example, a project-funded video, "Who cares about the Fish?" illustrating the community-based fisheries extension program was made with Extension staff participation. The video has been used to promote the extension process in Samoa and other Pacific Islands. Staffs of Fisheries agencies in other Pacific Island countries (including Tonga and Fiji) have been provided with assistance and advice on setting up similar community-based village programs. The Coordinating Committee of the Ha'apai (Tonga) Conservation Area Project visited Samoa in July 1998 to view the fisheries extension process.

Extension staff assisted with the organisation of the program for the Year of the Coral Reef, as well as supporting schools in the Senior School Science Competition. Press as well as Television and Radio releases, relating to the extension program in villages, have been produced regularly.

Extension staff continued to work with other agencies including DEC, FAO IOI, and SPREP in projects such as the train the trainers workshop for the SPREP-funded Samoa Village level Coral Reef Monitoring Pilot Project. Under this project, communities are encouraged to survey and monitor the marine environment adjacent to their villages.

Village-level fish farming, based on a fast-growing species of fresh-water Tilapia continued to be supported by the Fisheries Division through their extension and research works. Tilapias have now been introduced into 18 locations with mixed success. Through the extension and research activities, villages were encouraged to monitor and look after the clams placed in their reserves.

The trial mullet farm at Satapuala continues to be supported, with Fisheries Division supplying fry on a regular basis and Extension staff doing follow-up visits. There is a plan for a second pond to be established in the area beside the existing pond.

In addition village workshops on giant clam maintenance and tilapia farming have been conducted for over 40 villages by both the Technical and Extension staff of the Division.



Community workshops on fishing, sea safety, outboard maintenance, fish handling, and small business management connected with the operation of village fishing boats have been completed in an additional five locations for people from ten villages.

Extension and the Technical staff have continued to promote the use of medium-sized, low-cost, boats and outboard engines in Outer Reef Slope (ORS) fishing from coastal villages during period. Over 30 boats imported from Australia and assembled locally are in operation in villages. A Master fisher, employed by the project, conducted training associated with ORS fishing, with support from Extension staff. An analysis of the catch effort and costs of ORS fishing was completed.



**Table 23:** Villages targeted by the Fisheries Extension Program during the period June 97 to August 98. Dates shown include those of the first village contact, the first fono meeting, group meetings, and FMAC meetings. Villages on Savaii are shown in bold italics.

VILLAGE (Savaii in bold italics)	First contact	First fono meeting	Group Meetings	FMAC meetings	Plan approved	Reserve declared	FRS conducted	Bylaws to AG	Bylaws signed
Mulivai, Safata	6 Jun.97	16 Jun.97	24 Jun-2 Jul.97	2 Jul-16 Jul.97	<b>31 Jul.97</b>		yes	12/08/97	26/05/98
<b><i>Lu'uafaga</i></b>	7 Jun.97	(declined)							
Saanapu	19 Jun.97	14 Jul.97	21 Jul-30 Jul.97	30 Jul-15 Aug.97	<b>9 Sep.97</b>		yes	10/09/97	22/06/98
Ulutogia	20 Jun.97	27 Jun.97	3 Jul-10 Jul.97	10 Jul-24 Jul.97	<b>1 Aug.97</b>		yes	21/08/97	27/05/98
Saleaumuua	16 Jul.97	23 Jul.97	5 Aug-12 Aug.97	12 Aug-17 Sep.97	<b>17 Oct.97</b>		yes	24/10/97	22/06/98
<b><i>Vaito'omuli</i></b>	4 Aug.97	5 Aug.97	12 Aug-27 Aug.97	27 Aug-Aug.97	<b>14 Oct.97</b>		yes	14/11/97	29/9/98
Satupuala	5 Aug.97	13 Aug.97	20 Aug-16 Sep.97	23 Sep-1 Oct.97	<b>31 Oct.97</b>		yes	7/10/97	22/06/98
Safa'ato'a	22 Aug.97	12 Sep.97	2 Oct-15 Oct.97	4 Nov-18 Nov.97	<b>10 Dec.97</b>		yes	Jan-98	22/06/98
<b><i>Salailua</i></b>	25 Aug.97	(declined)							
<b><i>Satuaiatua</i></b>	25 Aug.97	(declined)							
<b><i>Safune</i></b>	17 Oct.97	(declined)							
<b><i>Manase</i></b>	25 Nov.97		(delayed until 1999)						
Faleapuna	27 May 97	8 Aug.97	22 Aug-19 Sep.97	4 Mar-10 Mar.98	<b>16 Mar.98</b>		yes	23/03/98	29/9/98
<b><i>Sapapalii</i></b>	26 Jan.98	27 Feb.98	13 Mar-17 Mar.98	17 Mar-14 May 98	<b>11 Jun.98</b>		yes	?Nov/98	29/9/98
Faleu uta	29 Jan.98	26 Feb.98	26 Feb-5 Mar.98	5 Mar-18 Mar.98	<b>3 Apr.98</b>		yes	15/04/98	
Saluafata	2 Feb.98	13 Feb.98	6 Mar-13 Mar.98	13 Mar-8 Apr.98	<b>23 Apr.98</b>		yes	1/05/98	12/06/98
Vailoa, Aleipata	5 Feb.98	27 Feb.98	19 Mar-31 Mar.98	31 Mar-22 Apr.98	<b>30 Apr.98</b>		yes	14/05/98	29/9/98
Solosolo	4 Mar.98	11 Mar.98	24 Mar-7 Apr.98	16 Apr-23 Apr.98	<b>27 Apr.98</b>		yes	25/06/98	12/06/98
Fasito'otai	17 Mar.98	17 Apr.98	21 Apr-4 May 98	18 May-4 Jun.98	<b>15 Jun.98</b>		yes	22/06/98	29/9/98
Faleula	27 Mar.98		(delayed until 1999)						
Vailu'u tai	13 Apr.98	19 May 98	8 Jun-18 Jun.98	24 Jun-3 Jul.98					
Amaile	20 Apr.98	12 Jun.98	(declined in favour of IUCN project)						
Lalomanu	20 Apr.98	(delayed until 1999)							
Faleatiu	21 Apr.98		(delayed until 1999 due to intervillage dispute)						
Vaie e'e	21 Apr.98		(delayed until 1999 due to relocation of village)						
<b><i>Papa i palauli</i></b>	29 Apr.98	7 May 98	15 May-17 Jun.98	22 Jun-1 Jul.98					
Utu fa'a lalafa	24 Jun.98	6 Jul.98	16 Jul-98	23 Jul 98					
Samatau	29 Jun.98	24 Jul.98	28 July 98	4 Aug 98					

## 10. VEHICLE

The Fisheries Division continued to use the four pickup vehicles, donated by the USAID in 1991, for its activities during 1997/98 period. All the vehicles are in good condition and were extensively used for the Division's operation on Upolu and Savaii. Three vehicles are based in Apia and one was utilised for the implementation of extension activities on Savaii. Table 24 presents details concerning the use of vehicles that were operational during the year.

*Table 24. Details on Fisheries vehicles use during the 1997/98 period.*

Vehicle No.	Location / Base	Type & Model	Year	Funding Source	Remarks
9031	Asau	Isuzu, Double cap	1991	USAID	Extension
9029	Apia Aquaculture Research Statistics	Isuzu Single cap	1991	USAID	Fisheries surveys, Resources Assessment, Fisheries reserve assessment Giant clams, Fish farming
9479	Apia Exploratory fishing	Isuzu Single cap	1991	USAID	Exploratory fishing trials, Safety at Sea, Vessel Inspection, Fishing training
9030	Apia Fish Market	Isuzu Single cap	1991	USAID	Market management and maintenance

## 11. MOTORISED ALIA FISHERY

### 11.1 Fuel rebate subsidies

The Fisheries Division continued to issue permits to locally registered fishermen using motorised fishing vessels entitling them to the Government fuel subsidy scheme. The scheme was an incentive encouraging and assisting local fishers to further promote the development of fishery in Samoa.

A total of about 2.4 million liters of pre-mixed fuel, valued at around SAT\$2.9 millions was estimated being used in the motorised fishery industry during 1997/98. About 18% (SAT\$0.43) of the total cost of fuel used was subsidised by the Government of Samoa through its incentive scheme. The Upolu based fishing vessels accounted for about 91%, Savaii accounted for 8.9% and Apolima based boats accounted for a mere 0.1% of the total Government subsidies in 1997/98.

The close proximity of the Apia landing site to the fuel main depots, the off-loading markets and export companies thus attributed to the large number of boats using the

infrastructure as their landing base. Furthermore, the Fisheries wharf provided not the ideal protected mooring location but other services as well such water, lights and motor maintenance. The Apia based fishing *alias* represented the largest portion (55.4%) of the subsidised amount. Siumu based boats accounted for about 12.4%, Savaii (7.2%), Falealili (4.7%) and Apolima (4.4%) represented smaller proportion of the total value of subsidised pre-mixed fuel. The summary of the total pre-mixed fuel in volume and value being subsidised by the Government in 1997/98 is presented in Table 25.

*Table 25. Total pre-mixed fuel subsidised by the Government in 1997/98*

Locations	Total fuel		Total fuel used		Total cost of
	Rebate	(liters)	(gallons)	Fuel used	
Apolima	\$ 18,813.60	107,200.00	23,584.00	\$ 128,045.04	
<b>SAVAII ISLAND</b>					
Asau	\$ 1,228.50	7,000.00	1,540.00	\$ 8,361.15	
Avao	\$ 1,298.70	7,400.00	1,628.00	\$ 8,838.93	
Gataivai	\$ 1,474.20	8,400.00	1,848.00	\$ 10,033.38	
Palauli	\$ 12,214.80	69,600.00	15,312.00	\$ 83,133.72	
Salailua	\$ 3,088.80	17,600.00	3,872.00	\$ 21,022.32	
	<b>\$ 38,118.60</b>	<b>217,200.00</b>	<b>47,784.00</b>	<b>\$ 259,434.54</b>	
<b>UPOLU ISLAND</b>					
Apia Fish Wharf	\$ 235,506.40	1,341,916.81	295,221.70	\$ 1,602,852.53	
Falealili	\$ 19,796.00	112,797.72	24,815.50	\$ 134,731.24	
Faleasiu	\$ 7,020.00	40,000.00	8,800.00	\$ 47,778.00	
Fasitoouta	\$ 842.40	4,800.00	1,056.00	\$ 5,733.36	
Lalomalava	\$ 1,158.30	6,600.00	1,452.00	\$ 7,883.37	
Lalomanu	\$ 3,825.40	21,797.15	4,795.37	\$ 26,035.61	
Laulii	\$ 8,318.70	47,400.00	10,428.00	\$ 56,616.93	
Leauvaa	\$ 9,441.90	53,800.00	11,836.00	\$ 64,261.41	
Letogo	\$ 631.80	3,600.00	792.00	\$ 4,300.02	
Leulumoega	\$ 1,755.00	10,000.00	2,200.00	\$ 11,944.50	
Lufilufi	\$ 8,143.20	46,400.00	10,208.00	\$ 55,422.48	
Matautu	\$ 10,986.30	62,600.00	13,772.00	\$ 74,772.57	
Mulifanua	\$ 8,005.70	45,616.52	10,035.64	\$ 54,486.66	
Nofoalii	\$ 1,088.10	6,200.00	1,364.00	\$ 7,405.59	
Salani	\$ 2,141.10	12,200.00	2,684.00	\$ 14,572.29	
Salelologa	\$ 1,614.60	9,200.00	2,024.00	\$ 10,988.94	
Samalaeulu	\$ 1,579.50	9,000.00	1,980.00	\$ 10,750.05	
Sataua	\$ 6,141.60	34,994.87	7,698.87	\$ 41,799.62	
Satuiatua	\$ 1,930.50	11,000.00	2,420.00	\$ 13,138.95	
Siumu	\$ 52,474.50	299,000.00	65,780.00	\$ 357,140.55	
Toamua	\$ 947.70	5,400.00	1,188.00	\$ 6,450.03	
Vailele	\$ 3,861.00	22,000.00	4,840.00	\$ 26,277.90	
	<b>\$ 387,209.70</b>	<b>2,206,323.08</b>	<b>485,391.08</b>	<b>\$ 2,635,342.60</b>	

## **12. MECHANIC WORKSHOP**

The Mechanic Workshop continued to provide services of outboard engine repairs for local fishers at SAT\$20 per repair work regardless of the magnitude and nature of the job. Accordingly, the high-powered outboard engines ranging from the 75 to 200 hps dominated the bulk of repair works in 1997/98. The increases in distance travels, frequent fishing trips, poor maintenance and over loading maybe attributed to the breakdown of these engines.

Similar to the 1996/97 period, more than 50% of repaired engines in 1997/98 were of those in the high-powered range of the Yamaha and Mariner models. The Yamaha model is the most common sought engine types because of its fuel consumption efficiency.

## **13. FISH MARKET**

The Apia Fish Market continued to operate under the management of the Fisheries Division in 1997/98. The daily operation involved the management and maintenance of the open side of the market for the general public to trade their fishery products. The market operates seven days a week and open from 0600 hrs to 1800 hrs everyday except Saturday and Sunday. The market operates from 0600 to about 1300 on Saturday and from 0500 to 0700 hrs on Sunday.

### **13.1 Functions**

The Fish Market consists of a manager, 2 staff and 3 casuals. The manager is responsible for the administration and the general management of the Fish Market. He liases with the Health Department, Police Dept, and Environment on issues of mutual interest. For example, any fish suspected of being caught by using dynamite or other illegal methods is reported immediately to the police. Health also will be contacted if someone is suspected of selling bad fish.

The staff is responsible for rent collection and to assist the Fish market surveyors in carrying out surveys whereas the casual workers is responsible for cleaning and the hygienic conditions of the Fish market. Sunday is considered the busiest day of the

week and all staff and casuals worked together in collecting rents and the cleaning of the market.

### 13.2 Revenues generated from the Fish Market

A total of SAT \$54,441.00 was generated based on the \$4 and \$5 tala per block occupied per day, which means an average of about SAT \$4,537 per month or \$1,047 per week. This account for approximately 1,000 sellers per month using the fish market for trading fishery products purposes. Table 26 presents the summaries of the total revenue collected per month for the period 1997/1998.

*Table 26. Monthly summary of revenues generated from the Fish Market through block renting.*

Months	Total Revenue (Tala)	Weekly Avg (Tala)
July 1997	\$4,715.00	\$1,178.75
August 1997	\$4,610.00	\$1,152.25
September 1997	\$4,952.00	\$1,238.00
October 1997	\$4,390.00	\$1,097.50
November 1997	\$4,578.00	\$1,144.50
December 1997	\$4,282.00	\$1,070.00
January 1998	\$4,059.00	\$1,014.75
February 1998	\$4,302.00	\$1,075.50
March 1998	\$4,787.00	\$1,196.75
April 1998	\$4,156.00	\$1,039.00
May 1998	\$4,952.00	\$1,238.00
June 1998	\$4,658.00	\$1,164.50
<b>Total</b>	<b>\$54,441.00</b>	<b>\$1,046.88</b>

#### Future activities

- Continue the daily operation, management and the general management of the market
- Continue collecting revenues from block renting
- Assist in the monitoring of size limits on fish and invertebrates exposed for sale

### 14. TRAINING ATTENDED BY STAFF

During the 1997/98 period, several Fisheries staffs had the opportunities to undertake further training in their field of work both locally and overseas. These long, short and

on-going training were made possible through financial assistance provided by various funding agencies. Training was ranging from three years to few weeks in duration.

The training for extension personnel has been based on the requirement for a balanced understanding of both essential technical knowledge and community motivating/mobilising techniques. Eight Extension staff had been sponsored to local and overseas workshops, short courses and formal tertiary training during the year. Several staff continued to be sponsored for Certificate and Diploma of Tropical Fisheries Courses at the University of the South Pacific (USP).

During the period, a series of local workshops on policy and strategic planning were also attended. In addition, a one-week National workshop involving all Village Committees with Management Plans was held during October 1997 at IRETA, Alafua campus of USP. Extension and Technical staffs were responsible for the organisation and presentation at these workshops.

Selected staff from the Research, Development and the Fish Market also attended various appropriate training courses overseas to further their understanding with respect to their line of work. Table 27 summarises the list of courses and workshops attended by members of the Fisheries.

*Table 27. Summary of training courses and workshops attended by Fisheries Staff in 1997/98*

Course	Period	Location	Duration	Attendees	Sponsors
Fish Technology & Aquaculture	Aug97-Sep97	Korea	4 wks	Toafia Taumata Vaauli Tulitua	KOICA
SCBA Diving	Sept97	Apia	1 wk	Faataui Vaofusi	AusAid
HACCP	Oct97	Fiji	1 wk	Tusiupu Ualolo	FAO
HACCP	Oct97	Apia	1 wk	Posa Skelton	FAO
Biodiversity Conservation	Oct97	N Caledonia	1 wk	Atonio Mulipola	EU/ACP
Marine Awareness	Oct97	Apia	1wk	Extension staff	USP/ AusAid
Coral Reef Monitoring Techniques	Nov97	Tonga	2 wks	Posa Skelton Talavou Taua	SPREP AusAid
Research Attachment	Jan98	Fiji	3 wks	Posa Skelton	CSPOD
Skipper & Navigation	Feb98	NZ	2 wks	Toafia Taumata	SPC
Biodiversity & Coastal Sustainable Use	Jul98	Fiji	1 wk	Atonio Mulipola	World Bank
Fisheries Extension	Feb98-Jul98	NZ	6 months	A'a Mauletaua Mikaele Lafaele	SPC AusAid

## ACKNOWLEDGMENT

The Fisheries Division wishes to record its thanks and appreciation to the mentioning Governments and Agencies for their kind assistance provided to the development of fisheries in Samoa. Numerous assistance were provided during the year through the services of Consultants, services of Volunteers, supply of materials, supply of valuable



information, funding the participation to Fisheries Division staff to meetings, training, and courses. Moreover, they provided valuable technical advises and many other assistance in numerous ways. The following governments and Agencies:

- Government of Australia (AusAid)
- Food and Agriculture Organisation (FAO)
- Forum Fisheries Agency (FFA)
- South Pacific Aquaculture Development Project (SPADP)
- Secretariat for the Pacific Community (SPC)
- United Nations Development Programme (UNDP)
- Japan International Cooperation Agency (JICA)
- Korean Organisation for International Cooperation Agency (KOICA)
- South Pacific Regional Environment Programme (SPREP)
- University of the South Pacific – Marine Studies (USP)
- CSPOD II

Thanks and appreciation are also due to the various local Government Departments, in particular the Ministry of Foreign Affairs for the immense supports shown to various matters requested by the Fisheries Division.

Lastly, but not least, thanks are extended to our Minister, Director, Deputy Director and all the Divisional Heads for the tremendous supports extended to the Fisheries Division throughout the 1997/1998 year period.

## Appendix

### Domestic and export fishery landings 1997/98

Months	Exports fisheries		Domestic fisheries	
	Wt (kg)	Value (tala)	Wt (kg)	Value (tala)
Jul-97	55,192.59	528,826.77	89,374.02	480,315.56
Aug-97	63,896.08	336,752.28	21,613.04	115,071.01
Sep-97	58,372.41	582,522.33	39,820.15	159,999.62
Oct-97	119,277.66	867,851.42	15,045.14	132,116.08
Nov-97	175,961.15	1,229,901.00	29,695.90	158,110.24
Dec-97	605,700.01	3,771,853.68	31,455.43	167,480.14
Jan-98	29,592.31	196,801.23	21,982.24	117,036.59
Feb-98	19,452.46	524,476.35	24,752.68	131,790.20
Mar-98	46,910.08	714,384.98	25,673.19	136,693.58
Apr-98	176,516.93	2,243,228.62	42,142.18	224,376.98
May-97	645,238.44	6,167,383.15	33,899.40	180,489.15
Jun-98	212,511.15	2,101,468.17	19,086.64	101,620.86
<b>Total</b>	<b>2,208,621.26</b>	<b>19,265,449.97</b>	<b>394,540.00</b>	<b>2,105,100.00</b>

### Longline fishery landings 1997/98

Month	CPUE	Fish/100hks	Avg hks	Av wt/fish	Boats	Est wt (mt)
Jul-97	0.220	6.9	300	9.5	220	290.4
Aug-97	0.207	6.3	300	9.8	220	273.2
Sep-97	0.156	4.9	300	9.6	220	205.9
Oct-97	0.286	7.9	300	10.8	220	377.5
Nov-97	0.334	8.8	300	11.4	220	440.9
Dec-97	0.284	9.0	300	9.5	220	374.9
Jan-98	0.071	1.2	350	19.9	220	109.3
Feb-98	0.052	1.0	350	17.5	220	80.1
Mar-98	0.051	1.1	350	15.6	220	78.5
Apr-98	0.049	1.0	350	16.4	220	75.5
May-98	0.065	1.3	350	18.1	220	100.1
Jun-98	0.052	1.2	350	15.7	220	80.1
						2,486.44

CPUE: kg/hk/hr

