FISHERIES DIVISION

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MINISTRY OF AGRICULTURE, FORESTS, FISHERIES & METEOROLOGY

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HIGHLIGHTS

Due to the comparatively low level of budget allocation for the Fisheries Division during the 1995/1996 period, effort to achieve scheduled goals was difficult. Nevertheless, with available resources, the Division was able curtail its activities so as to fulfil its obligation and provide its services for the proper utilization, development and management of the country's fishery resources.

The Division's Nile Tilapia hatchery was successful in the production of fingerlings which were used to stock grow-out experiments to assess the potential of inland fish farming as a source of fish protein. Initial results from surveys conducted at the Afulilo Reservoir were encouraging. The results indicate that the reservoir was suitable for stocking Nile Tilapia and thus a potential source of fish production.

Fishery statistics collected by the Division indicated a huge increase of fishery product exports. The huge increase was due mainly to the shift of the alia fleet to longlining after the establishment of markets overseas for fresh tuna as well as that for canning. The total value of fishery product exports exceeded $2,000,000 in 1996.

The four Tropac Fishing Company longliners were again licensed to fish in Western Samoa's Exclusive Economic Zone for the 1 January-31 December 1996 period under the same conditions and fees as were applied during the previous licensing period.

Cabinet approved awarding the installation of the Fishermen Safety at Sea Project to a local company. Equipment were ordered and assembling and installation were started by the end of the period. This project will greatly minimise the risk and cost involved in rescue searches of fishermen lost at sea.

With funds from the Government of Australia through AusAID, the Fisheries Division has set up and improved its advisory services with the establishment of the Fisheries Extension and Training Project. By June 1996, a total of 13 villages had been contacted and established for the Extension Process. Of this total, the process was discontinued in 2 villages, 8 villages were in various stages of the process while 3 had established Fisheries Management Plans. As part of the public awareness campaign, a Fisheries Open Day was held in November, 1995. A poster competition on the marine environment theme was also held.

PROGRAMMES

1. AQUACULTURE

1.1 Giant Clams

As reported in the previous Annual Report, two lagoon giant clam farms were started on Savai'i Island at the villages of Si'ufaga and Vaisala.

Si'ufaga Giant Clam Project: This giant clam project was initiated in December, 1994 with about 338 *T. squamosa* and 182 *T. derasa* imported from Fiji in 1992 and 1993 and originally raised at Namu'a. The clams were placed on trays at a density of 8 clams per tray and two trays were fitted into a cage for protection from large predators.

Table 1 records data on growth that were collected in five months between planting date, December, 1994 and September, 1995. From February to September (7 months), *T. squamosa* exhibited an overall mean shell length increment of 16 mm. This corresponds to an average growth rate of about 2.3 mm per month. *T. derasa* exhibited a slower growth for the same period having an overall mean shell length increment of only 9 mm, or approximately 1.3 mm per month. These growth rates are slower compared to growth attained in other countries for the same species.

By September, 1995, a total of 214 *T. squamosa* and 93 *T. derasa* were left at the farm, representing mortalities of 34% and 47% for each species respectively during that period. However, by the end of the year, all of the giant clams planted at the site were gone.

Table 1: *Mean shell lengths for giant clam species planted at Si'ufaga.*

Survey Date	*Tridacna squamosa*		*Tridacna derasa*	
	Mean length (mm)	**Increment (mm)**	**Mean length (mm)**	**Increment (mm)**
Dec., 1994				
Feb., 1995	99		120	
May, 1995	108	9	128	8
July, 1995	109	1	128	0
Sept., 1996	115	6	129	1
Overall		16		9
Average growth rate		2.3 mm/month		1.3 mm/month

Vaisala Giant Clam Project: The giant clam farm at Vaisala was started in May, 1995 using 108 *T. squamosa* (from a mixture of clams imported from Fiji in July, 1992 and February, 1993), 156 *T. derasa* (imported from Fiji in February, 1993), 105 *H. hippopus* and 11 *T. gigas* (imported from Australia in May, 1991).

Table 2 records growth data recorded at the Vaisala nursery for marked cages, for the different species, that remained throughout the May-September 1995 period. Overall, *T. derasa* showed faster growth than both *T. squamosa* and *H. hippopus*. Giant clam growths were higher in Vaisala than in Siufaga for the period. Growth rates obtained at Vaisala, 2.3-5.5 mm/month for *T. derasa*, 3.0-3.8 mm/month for *T. squamosa* and 2.0-2.8 mm/month for *H. hippopus*, are comparable with growth rates obtained in other countries for these species.

During the May-September 1996 period, *T. squamosa* had a 39% mortality, followed by *T. gigas* with 36 % mortality, then *T. derasa* with 22% mortality with *H. hippopus* having the lowest mortality of only 7%.

Table 2*: Giant clams growth data recorded for species cultured at the Vaisala lagoon nursery.*

	Tridacna squamosa				*Tridacna derasa*						*Hippopus hippopus*			
Tray # →	404		130		196		463		290		30		148	
1995	Len	Inc	Len	Inc	Len	Inc	Len	Inc	Len	Inc	Len	Inc	Len	Inc
May	117		120		145		153		163		159		158	
Jul	124	7	125	5	151	6	158	5	170	7	163	4	163	5
Sept	128	4	128	3	167	16	166	8	172	2	171	8	173	10
Overall Increment		11		8		22		13		9		12		15
Growth rate mm/month		2.8		2.0		5.5		3.3		2.3		3.0		3.8

Len=Mean shell length in mm; Inc=Shell length increment (mm)

Giant clam mortalities at the two sites were caused by the predator snail, *Cymatium muricinum*, strong currents and poaching. The high mortalities experienced in both sites indicate the level of maintenance required in order to increase giant clam survival and thus the success of such a venture.

Future Activities

- Continuation on monitoring of growth and mortality at the village farms.
- Conduct surveys in other areas with potential lagoons for giant clam farming and initiate lagoon nurseries especially in villages with management plans established under the Fisheries Extension and Training Project.
- Provide training for villagers concerned on farm maintenance and operation.

1.2 Fresh-water Fish Farming - Nile Tilapia, Oreochromis niloticus

1.2.1 Hatchery

As reported in the previous report, the Nile Tilapia breeders at the Division hatchery were properly selected and sexed for proper breeding purposes at the end of June, 1995. Details pertaining to this are as follows:

Tank #	Sex	No. of fish	Ave. body weight (g)
1	males	79	
2	females	21	
3	males & females	1,178	23
4	males & females	383	103
5	males & females	149	93

Fry from the hatchery were used to stock ponds at the Salani Demonstration Farm as well as the fish farm at Solaua and other fish culture experiments by the Division.

1.2.2 Demonstration Farm

The 2 grow-out (each measuring 20m x 25 m) and 2 nursery (measuring 5m x 10m) demonstration ponds at inland Salani were constructed with financial assistance of the FAO South Pacific Aquaculture Development Project (I) and were fully operational by the end of 1993.

As reported previously, results of the harvest from one of the grow-out ponds in June 1995, approximately after 1 year of culture, were disappointing in that even though survival was high (almost 100 per cent), growth was very poor in that only 25.5 kg of fish was obtained, with individuals averaging 43.3 g each. The poor growth was attributed to poor pond construction (pond design), poor farm management by the farmer and poor feed.

On 11 May, 1996, 365 Nile tilapia fingerlings were stocked into one of the growth-out ponds employing the "Acadja" system, i.e. bamboo were stuck in the water hoping to increase growth of algae on which the fish will feed. However, it was noted that the pond culture water was still clear by the time stocking took place. The farmer was advised to apply more fertilizer (compost or chicken manure). Another 409 were stocked on 21 May, 1996.

One of the major problems with the Salani Fish Farm, in terms of monitoring by the Division, is its location, remote and the road is always very bad making it impossible for vehicles to use. The farmer did not follow advise provided by the Division most of the time.

1.2.3 Cage Culture

The experimental cage culture of tilapia in a swamp at Solaua using a wire cage measuring 1.6m x 1.6m x 0.6m in height and covered with a 25 mm netting (except for the top) was initiated in June, 1995 as reported previously. The cage was stocked with 13 juvenile Nile tilapia (average weight, 84.8 g) in the same month from the Division hatchery. Unfortunately, the cage was destroyed by a cow. A bigger cage, 8.3 m x 8.3 m x 0.6 m high, was built and deployed in September, 1995 after part of the site was fenced off. One hundred and forty fish (average weight, 87.5 g) were stocked into the cage in the same month. The experimental cage culture was not completed as the netting used for the bottom rot and the fish escaped.

1.2.4 Pond Culture

One of the grow-out ponds at the Solaua fresh-water crayfish farm was stocked with 3,450 Nile tilapia fry from the Division hatchery in June and July, 1995. Due to severe leakage from the pond, all of the fish were lost by October, 1995. Using another pond with no leakage problem, 3,064 fry were stocked at the end of

October, 1995. Fish growth recorded was better in this pond than that obtained at Salani. However, no details were made available for the harvest.

1.2.5 Afulilo Reservoir Survey

The survey to assess the feasibility of stocking the Afulilo Reservoir with Nile tilapia to serve as a source of fish was initiated in March, 1996. A total of four 24-hour surveys were conducted in March, and May of 1996. Two surveys were conducted in each month, one during the first week and the other one, two weeks later. Three different stations were chosen within the reservoir where data were collected from.

During each 24-hour survey, data were measured every six hours starting at 18:00 pm and finishing at 12:00 noon the following day. Thus data were collected at 18:00 hour, 12:00 mid-night; 06:00 hour and 12:00 noon. The major parameters considered include, temperature, turbidity (as an indicator of plankton density), Dissolved Oxygen (DO), and pH.

Preliminary results indicate that Afulilo Reservoir has the capacity to support stocks of fish grown in it. This is taking into account temperature, DO levels, pH, availability of natural food and volume of water. In fact, the parameters in the reservoir present an ideal situation for fish growth. The only limiting factor at this stage seems to be the density of phytoplankton within the water. However, this does not rule out the potential of the reservoir for stocking fish, but rather it limits the full capacity of the water available in terms of fish production.

1.2.6 Nile Tilapia Taste Test Survey

During the Fisheries Open Day, 2 November, 1995, a survey was conducted to assess the reaction of the public on the Nile Tilapia that Fisheries Division is trying to promote as an alternative source of protein by fish farming. Specifically, the study examined the acceptability of the Nile Tilapia as a food fish by having the public evaluating its taste against those of other fish cooked in the same, especially the Samoan traditional methods of cooking fish. Nile tilapia were cooked in the different methods, boiled in coconut cream, baked in the Samoan "umu" and smoked. The first two methods are common ways of cooking fish in Western Samoa. For comparison, bottomfish were also cooked in the Samoan "umu". In addition, skipjack and bottomfish were also smoked the same way Nile tilapia was smoked. No other fish, except tilapia, was cooked in coconut cream but tasters were asked to compare its taste with other fish, such as reef fish. The results for tilapia cooked in coconut cream indicated that 63 per cent of the respondents preferred Nile tilapia over other fish while the other 38 per cent rated tilapia to be the same as other fish. For fish that were cooked in a Samoan "umu", 61 per cent of the respondents preferred tilapia over bottomfish, 33 per cent rated both tilapia and bottomfish the same and only 6 per cent preferred bottomfish over tilapia. The result obtained for fish that were marinated with garlic and curry and then smoked were that 64 per cent of the responses rated bottomfish as their first preference, 30 rated tilapia as their first preference and only 6 per cent rated skipjack as their first preference. For fish that were marinated in soya sauce and ginger and then smoked, about 48 per cent of the respondents rated bottomfish as the first preference, about 46 per cent rated tilapia as their first preference and only about 6 per cent preferred skipjack over the other two.

Future Activities

- Locate and establish another "demonstration" farm which is more central and easily accessible to the public.
- Conduct surveys to identify other areas with existing potential sites for inland fish farming.
- Complete data collection at the Afulilo Reservoir to fully assess its potential for fish stocking and if conditions prove to be suitable, then a stocking schedule will be devised.
- Provide assistance to establish new fish farms.
- Continue to provide technical assistance for improving production from the demonstration farm.
- Conduct a second tilapia taste study comparing Nile Tilapia and common reef fish.
- Stock natural bodies of water with potential of fish production.

1.3 Fresh-water crayfish

As reported previously, approximately 10,000 juveniles of redclaw, *C. quadricarinatus*, juveniles were imported in mid-1995 (12 June, 1995) by the Solaua AquaFarm, with the operation under a different manager. These juveniles were stocked directly into one pond at Solaua and cultured using "green water" without application of supplementary feed during the initial phase of the grow-out. For the first five months, the natural vegetation in the pond provided the only food for the crayfish. After 5 months, supplementary feed, including waste coconut, and brewers spent grain were added and pond fertilization was provided by the application of chicken manure. Harvest was conducted in late April, 1996 (11 months after stocking). Average size per crayfish was 90-100 grams with the largest weighing 160 gm+. Many second generation juveniles were also collected during the harvest. At harvest, a total of approximately 2,000 individual crayfish weighing 90-100 gm were collected (thus about 190 kg). Most of these were sold to the Tusitala Hotel. In addition, 2,000-3,000 juveniles were harvested and transferred to another pond. The farm manager reported that the harvest was far less than expected due to high predation by birds, including the red banded rail and the heron, and poaching. The farm operation has ceased due to lack of capital input from owner to rectify problems like pond leakage.

2. FISHERIES STATISTICS AND RESOURCE ASSESSMENT

2.1 Fishery Product Commercial Landings

The collection of fisheries landing statistics is one of the Division's on-going programmes. Data collection surveys are conducted on randomly chosen days of the week at various commercial outlets. On each sampling day, major taxa (families to species) of fishes and invertebrates are recorded, lengths are measured and numbers counted. The weights are then estimated from lengths, using a table of weight/length relationship for various types of fishes produced for similar studies in Fiji. Other information on economic value and effort (fishing hours, location, fuel consumption, number of crew, fishing methods, etc.) are obtained from interviewing sellers, proprietors of other outlets or from receipt books. Data are entered into the fishery database which is in ACCESS. On each sampling day, data are summarised and entered with landings estimated on a monthly basis and reviewed annually.

The Fisheries surveys which were implemented by the Division in the 1995/1996 period are as follows:

(a) Offshore tuna fishery survey at the Apia Fish Market.
(b) Offshore bottomfish fishery survey at the Fish Market.
(c) Inshore fishery survey at the Apia Fish Market.
(d) Apolima landing site survey.
(e) Wholesalers, retailers, restaurant survey.
(f) Shellfish survey (Apia to Vaiusu).
(g) Longline catch survey of large fishing vessels.

Table 3a shows monthly summaries of fishery products sold at the Apia Fish Market while Table 3b records fishery landings at retailers on Upolu and Apolima for the 1995/1996 period.

Compared to last year, landings for the 1995/1996 period at the Apia Fish Market from the main three fisheries (tuna, bottomfish and inshore), were lower in terms of estimated weight. However, increases in value were recorded for the three fisheries indicating increases in selling prices. The decrease in fish landings is not indicative of an overall decrease in fish catches but rather reflective of a change in marketing strategies where more fish, especially tunas, were exported as indicated in export figures under Section 2.2.3 of this report. The higher value could have been caused by the decrease in landings.

An increase in fish landing was recorded at the Apolima Landing Site in 1995/1996 as compared to 1994/1995. No fish landings were available from Savaii.

Table 3a: *Monthly summaries of fishery products sold at the Apia Fish Market on Upolu Island. [Wt in mt and Value in Tala (`000)].*

	1995						1996						
FISHERY	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**TOTAL**
TUNA													
Wt	94.6	99.2	91.7	81.2	2.4	48.6	49.2	15.6	30.8	19.9	24.8	10.6	**568.6**
Value	416.2	476.2	367.0	357.3	7.2	175.0	166.8	53.0	104.3	67.4	84.1	35.9	**2,310.4**
OTHER PELAGICS													
Wt							0.01	0.15	0.58	0.17	0.43	1.1	**2.44**
Value							0.05	0.71	2.76	0.81	2.04	5.24	**11.61**
BOTTOMFISH													
Wt	0.7	0.1	0.6	0.7	0.4	1.4	0.43	2.0	2.1	1.4	2.8	3.1	**15.7**
Value	1.7	0.2	1.3	1.7	0.8	3.5	19.8	9.3	9.7	6.6	12.9	14.3	**81.8**
INSHORE FINFISH													
Wt	2.8	4.2	3.9	3.1	2.1	2.7	3.4	3.4	3.0	2.1	4.3	3.2	**38.2**
Value	20.0	30.0	27.8	22.1	15.0	19.3	24.3	24.3	21.4	15.0	30.7	22.8	**272.7**
BIVALVES													
Wt	-	-	-	-	-	-	0.2	0.02	0	0	0	0	**0.22**
Value	-	-	-	-	-	-	6.5	0.9	0	0	0	0	**7.4**
CRUSTACEAN													
Wt	-	-	-	-	-	-	0.4	1.0	0.8	0.5	1.5	0.6	**4.8**
Value	-	-	-	-	-	-	4.6	9.9	14.1	13.6	19.2	14.2	**75.6**
MOLLUSC													
Wt	-	-	-	-	-	-	3.1	1.0	2.5	1.5	0.7	0.8	**9.6**
Value	-	-	-	-	-	-	4.9	5.4	4.7	7.3	4.5	2.7	**29.5**

-indicates data unavailable at time of reporting.

Table 3b: *Monthly summaries of fishery products purchased by Retailers (Jan-June, 1996 only) and those landed at Apolima on Upolu [Wt in mt and Value in WST '000].*

UPOLU	1995						1996						
Site/Fishery	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**TOTAL**
RETAILERS													
Wt	-	-	-	-	-	-	1.1	1.8	2.7	0.5	1.6	1.2	**8.9**
Value	-	-	-	-	-	-	4.5	7.7	11.1	1.9	6.9	6.0	**38.1**
APOLIMA													
Bottomfish													
Wt	5.8	3.3	8.0	8.5	5.2	12.0	1.1	2.4	2.8	2.1	8.3	8.5	**68.0**
Value	25.5	14.5	32.8	35.7	22.9	52.8	1.8	5.5	6.2	2.5	9.5	13.0	**222.7**

Table 4 below summarises the estimated total landings of the only big long-liner vessel based in Apia for the 1995/1996 period.

Table 4: *Summary of the long-liner landings of major species for the 1995/1996 period.*

	ALBACORE		BIGEYE		YELLOWFIN		BLACK MARLIN		STRIPED MARLIN		SAILFISH		SWORD FISH		OTHER	
MONTH	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)	#	Wt (kg)
1995																
July	236	4,017	42	984	41	906	1	35	5	160	1	30	2	90	25	50
August	431	7,330	48	1,046	53	1,216	2	80	7	30			1	55	72	551
September	275	4,685	58	1,160	26	595	1	40	4	220	3	115	3	155	47	350
October	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
November	440	7,540	16	294	1	50	4	155	0	0	2	35	1	84	0	0
December																
1996																
January	446	7,870	36	514	18	421	0	0	0	0	0	0	0	0	14	135

February	184	3,126	27	675	17	380	9	385	0	0	0	0	0	0	15	155
March	348	5,625	44	906	40	606	28	311	0	0	0	0	0	0	22	269
April	222	3,750	74	1,545	49	1,014	22	950	0	0	4	75	0	0	5	48
May	551	7,418	89	1,488	106	2,259	0	0	0	0	11	128	0	0	11	166
June	552	9,396	14	256	165	3,120	0	0	0	0	7	120	0	0	15	155
TOTAL	3,685	60,757	448	8,868	516	10,567	67	1,956	16	410	27	473	7	384	226	1,879

Future Activities

- Continuation of the Fisheries data collection programme.
- Work on upgrading and reviewing the collection, compilation/databasing and analysis systems for more accurate estimates, efficient generation of reports and information, and finer analysis operations. The South Pacific Commission will be requested to upgrade the system.

2.2 Fishery Product Exports

In addition to the export of beche-de-mer and aquarium fish exports, the export of fish, particularly tuna, has been increasing. Fisheries Division data on fishery products export is obtained through a certification of fishery products for export system, which was initiated in early 1995. This process involves conducting inspection of fishery products to be exported for compliance with Terms and Conditions and issuing a Certification for Fishery Products for Export.

2.2.1 Aquarium trade

During the year, licenses were issued to two new companies to catch and export aquarium fish. One was issued in November, 1995 and the other one was issued in June, 1996. In addition, the first company was also issued a license to export a limited amount of corals. Fisheries Division conducts inspection during collection and packaging to ensure the Terms and Conditions given are kept. Certification of fishery products for exports is issued each time a shipment is made.

Table 5: *Summary of aquariumfish, corals and other marine organisms export for the aquarium trade during the 1996 period.*

Organism category	Quantity (# pieces)	Average Price	Value (USD)	Organism category	Quantity (# pieces)	Average Price	Value (USD)
Algae	5	0.25	1.25	Shellfish	272	3.57	1,071.60
Anemones	730	1.15	798.70	Snail	1,025	0.05	51.25
Bio-rocks	495	1.04	437.00	Soft coral	40	2.53	124.90
Crab	22	0.05	1.10	Starfish	40	0.54	28.05
Live corals	1,677	2.80	4,472.25	Tropical fish	183	0.78	164.12
Sea cucumber	128	0.24	38.49	Unidentified	397	1.33	455.00
Sea urchin	10	0.53	4.90				
TOTALS	**3,067**		**5,753.69**		**1,957**		**1,894.92**

Future Activities

- Continue monitoring the development of the industry including trends in each particular fishery.
- Assess the potential of the resource for implementation of appropriate management strategies.

2.2.2 Beche-de-mer (processed sea cucumber

During the 1995/1996 period, only two exporters were involved with processing and exporting of beche-de-mer.

As reported in the previous report, even though certain species always fix good value in the market, prices do vary depending on the situation of the beche-de-mer market from time to time as well as how well the beche-de-mer was processed. Even though the volume of beche-de-mer exported in the 1995/1996 period was higher than that exported in the 1994/1995 period, the revenue generated was lower. This was due mainly to lower prices offered for some species.

Beche-der-mer species composition, by weight and value, exported during the 1995/1996 period is presented in Table 6. As was the case during last year, brown sandfish comprised the highest percentage of the volume exported. One major difference in species composition is the increase in volume of black teatfish in 1995/1996. In terms of weights, brown sand fish made up the largest portion (57.9 per cent) but a slightly lower portion in terms of value (41.6 per cent). Black teatfish made up only 16 per cent of the exported volume, but made up almost 37 per cent of the total export value. This particular species is one of the most highly valued species.

Table 6: *Beche-de-mer export composition by weight and corresponding values for the July 1995/June 1996 period.*

		Weight		Value	
English Name	**Samoan Name**	**Kg**	**% of Total**	**USD**	**% of Total**
Black teatfish	Susuvalu uliuli	5,108	16.0	25,495.20	36.6
Brown sandfish	Fugafuga	18,547	57.9	29,142.65	41.8
Greenfish	Maisu	2,403	7.5	3,854.70	5.5
Lollyfish	Loli	2,341	7.3	2,415.10	3.5
Surf redfish	Mama'o	1,418	4.4	3,589.45	5.2
Tigerfish	Ulutunu	1,950	6.1	4,743.00	6.8
White teatfish	Susuvalu pa'epa'e	241	0.8	397.00	0.6
TOTAL		**32,008**	**100.0**	**69,637.10**	**100.0**

2.2.3 Finfish

A steep upward trend of export of fish has been recorded. This trend is due to the increase in effort for longline fishing using the alia resulting from the establishment of overseas markets for tuna, especially albacore, yellowfin and bigeye. Table 7 summarizes records of fishery products exported during 1996 as recorded in the Fisheries database. As was the case last year, bottomfish and tuna exports were mainly to markets in the US, including American Samoa, New Zealand and Australia, whereas Inshore Fish were exported mainly to American Samoa. The data indicates that in terms of volume, tuna accounted for 98.5 per cent of the total recorded fishery export for the year. In terms of value, tuna account for 97.6 per cent of the total fish export value. A drop in bottomfish export was recorded. Compared to last year, there was a huge increase of volume in fish export during 1996. Import figures of tuna from Western Samoa at one of the canneries in American Samoa indicated that the actual figure of tuna exports is higher than that recorded. Thus the export of fishery products was worth much more than $2,000,000 as recorded.

Table 7: *Records of fishery products exported for food in 1996 period.*

	WEIGHT		VALUE	
FISHERY	**MT**	**% of Total**	**WST**	**% of Total**
Tuna	711.74	98.5	2,546,825	97.6
Other offshore pelagics	3.56	0.5	13,080	0.5
Bottomfish	3.17	0.4	18,911	0.7
Inshore Fish	4.19	0.6	31,515	1.2
TOTAL	**722.66**	**100.0**	**2,610,331**	**100.0**

Future Activities

- Continue with the monitoring and inspection programme for harvesting and exporting of fishery resources such as aquarium, beche-de-mer, finfish and other marine products.

- Ascertain that terms and conditions for export fisheries resources are strictly adhered to by exporting companies.
- Continue with the certification of fisheries products for exports.
- Improve the mechanism for recording the export of fishery products to obtain better estimates.

3. FISH AGGREGATING DEVISES (FADs)

This project maintained and monitored the FADs that remained from the last financial year (1994/1995) . Tautai Matapalapala took five separate trips to attend to maintenance duties on these devises. During these trips human interference have been observed on the unit off Saleaula. Salvage work were done on this FAD two times in order to put it back in shape and place. Two more devises were lost as a result of adverse weather condition. That leaves only two FADs remaining in our water (Saleaula and Falefa). Again there was no provision in this year's budget to purchase materials for any new devises.

Future Activities:

- maintain and monitor the remaining FADs.
- deployment of any new devises when materials are available for construction.

4. EXPLORATORY FISHING

Further trials had been undertaken on Longline Fishery. This time the effort was put into trying to determine the best sea depth for tuna catches. This was a difficult exercise as quite a number of factors affect the feeding behaviour of the fish in addition to other environmental factors like the current and tide flow conditions.

The project also maintained a regular check on the bottom fish stock. The main areas visited in these surveys were Aleipata, Falefa, Apolima and Saleaula.

Future Activities:

- Conduct training for new fishermen.
- Continue with bottom fish survey for management purpose.
- Investigate into improving longline fishing gear and methodology.

5. SURVEILLANCE

Offshore surveillance have been conducted by the Police patrol boat Nafanua. A Fisheries Officer is always made available to join the patrol boat during patrol missions.

Aerial surveillance were again conducted by the Government of Australia and New Zealand Royal Air Force. The two Governments are acknowledged for the invaluable assistance rendered to our surveillance programme.

Enforcement of the newly introduced Local Fisheries Regulations involving minimum size limits on several fish species were conducted at the Apia Fish Market. The Police Department is responsible for the enforcement of these regulations with assistance from Fisheries Division. An improvement was observed with a decrease in volume of undersized fish being sold at the Fish Market.

Future Activities:

- cooperate with the Police Department in surveillance activities both offshore and onshore
- participate in Aerial Surveillance when chance is offered on flight.
- increase area coverage for enforcement of the minimum size regulations and other related regulations.

6. LICENSING OF FOREIGN FISHING VESSELS

The Tropac Fishing Company again had their longline fishing licenses renewed for the 1996 licensing period (1 January - 31 December 96). Same conditions and fee rates, as given previously, were applied.

Future Activities:

- At present Western Samoa is involved in a Polymel Fishing Agreement negotiation with the Taiwanese longline fishing boats. This is a multilateral agreement between Certain Pacific Countries and Taiwanese Longline Fishing Companies.

7. FISHERMEN SAFETY AT SEA

Funds were approved by the Government to implement this project. Fisheries was so concerned with the high number of fishermen lost at sea due to the absence of communication. Lots of cases had happened very close to shore and were only minor problems but assistance could not be sought due to the lack of communication. Further more the Government has spent a lot of money on search and rescue mission when a fishing boat is reported missing.

Tenders were called for the construction and installation of the Radio network system. Acting on the advice from the project committee the cabinet approved the awarding of work to the Procom System Co. Ltd. Work for the network commenced towards the end of this financial year. These include ordering of equipment and materials from overseas, assembling and putting them in place.

Future Activities:

- Complete the installation of the network
- Conduct training for the fishermen on the use of the radio/telephone
- Monitor and maintain the operation of the network

8. FISHERIES ADVISORY SERVICES (EXTENSION AND TRAINING)

With funds from the Government of Australia through AusAID, the Fisheries Division has set up and improved its advisory services with the establishment of the Extension and Training Project. The activities done during the second half of 1995 was well training of Fisheries Extension Staff for the extension process and conduct technical and scientific training for newly appointed staff. A major activity for the first half of 1996 was the trialing and refinement of the strategy developed for community participation. The village extension process (summarised in Figure 1) was further refined during field operation in the first half of 1996. The process culminates in a Village Fisheries Management Plan which sets out the resource management and conservation undertakings of the community, and the servicing and technical assistance inputs of the Fisheries Division.

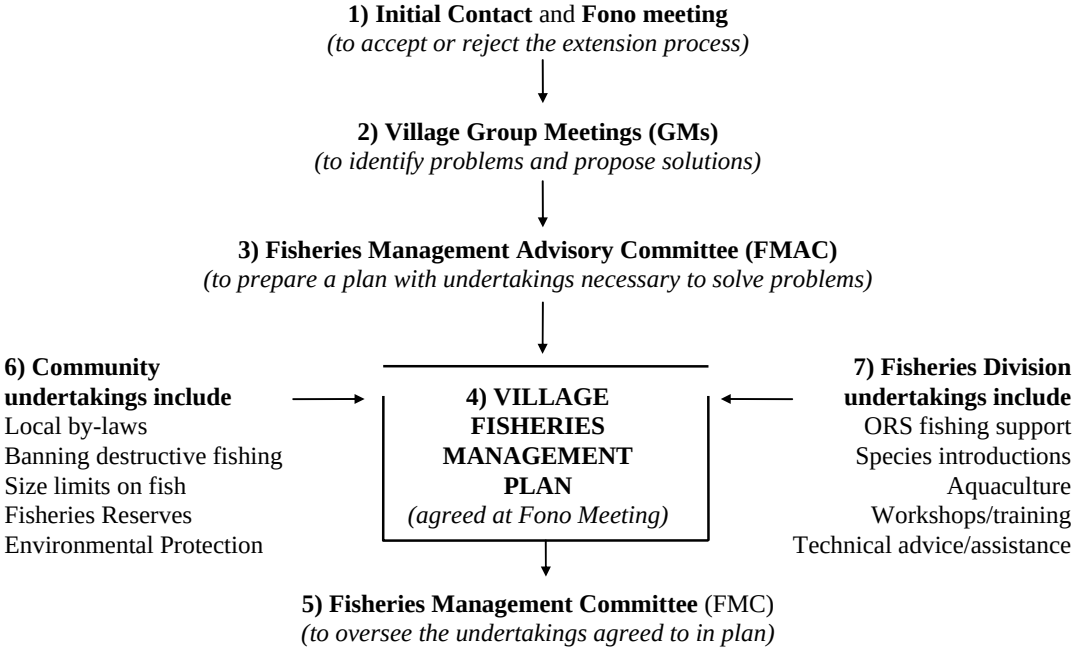

Figure 1: *The Fisheries Extension Process in Western Samoan villages.*

By the end of June 1996, the Extension Process has been commenced in 13 villages, and 3 have progressed to the stage of producing Fisheries Management Plans (Table 8). Two of the villages with approved Management Plans have established village Fish Reserves (the first such reserves in Western Samoa), and more villages have declared their intention to do so. These Management Plans are the first of 30 community agreements planned to be completed by the end of 1997.

As part of the public awareness campaign, a School Poster Competition (on the marine environment theme) was arranged to coincide with the Fisheries Open Day. Over 200 posters were received as entries, with prizes offered from locally-involved industries. Posters were judged and displayed at the project-initiated Fisheries Open Day, and prizes awarded by the Minister. The Open Day was held on 2 November, 1995, and events included smoked fish tasting, tilapia taste survey, a range of displays including giant clams, FADs, fishing equipment, minimum size limit measurements, tilapia hatchery and other activities depicting services provided by Fisheries, talks and video presentation.

The extension process has been discontinued due to lack of commitment in some villages (Table 8). The process has also been delayed in other villages for several reasons including court cases involving appeals against the 1996 election results and extended religions community conferences.

Table 8: *Villages targeted by the Fisheries Extension Program. Dates shown for stages in the process include those for first contact with the village, the first fono (council) meeting, Group Meetings, FMAC meetings, and the date of approval of the final Fisheries Management Plan by the village fono. Villages on the island of Savaii are shown in bold italics.*

VILLAGE ***(Savaii in bold italics)***	**First contact**	**Fono meeting**	**Group Meetings**	**FMAC meetings**	**Plan approved**
1) Moamoa, Faleasi'u.	1) 20 Nov.95	1) 22 Nov.95	1) 6-13 Dec.95	1) 20 Jan-28 Feb 96	1) **8 Apr.96**
2) Tauo'o, Faleasi'u.	2) 1 Feb.96	2) 5 Feb.96	2) 5-13 Feb.96	2) 18 Feb-12 Mar. 96	2) **15 May.96**
3) ***Tafua***	3) 7 Feb.96	3) 12 Feb.96	3) 12-21 Feb.96	3) 21 Feb-15 May 96	3) **13 Jun.96**
4) ***Satoalepai***	4) 19 Apr.96	4) 9 May.96	4) 24 May-17 Jun.96	4) 17 Jun-???	4)
5) Leusoalii	5) 22 Apr.96	5) 5 May.96	***5)*** 18 Jun.96	5) *(discontinued)*	5)
6) Luatuanu'u	6) 22 Apr.96	6) 13 May.96	6) 10 Jun.96	6) *(discontinued)*	6)
7) ***Vaega-Satupaitea***	7) 23 May.96	7) 14 Jun.96	7) *(delayed)*	7)	7)
8) Apai, Manono	8) 24 May.96	8) 6 Jun.96	8) 3-24 July 96	8)	8)
9) Salua, Manono	9) 24 May.96	9) 6 Jun.96	9) 3-25 July 96	9)	9)
10) Faleu, Manono	10) 24 May.96	10) 11 Jun.96	10) 4-24 July 96	10)	10)
11) Lepuia'i, Manono	11) 24 May.96	11) 11 Jun.96	11) 4-25 July 96	11)	11)
12) ***Satufea-Satupaitea***	12) 18 Jun.96	12) *(delayed)*	12)	12)	12)
13) ***Pitonu'u-Satupaitea***	13) 18 Jun.96	13) *(delayed)*	13)	13)	13)

Future Activities

- Create a Fisheries Extension Service which is effective, well-trained and community focused.
- Conduct public awareness programmes and workshops.
- Develop an effective and community-focused fisheries extension system.
- Undertake meetings with villages and setting various management and advisory committees.
- Organize and run workshops for high school teachers, pastors on the design of curricular incorporating components on fisheries resource conservation and environmental protection.
- Provide training/information on:
  - offshore fishing (operation of boats and gear);
  - aquaculture;
  - introductions/restocking of potential organisms;
  - creation of marine reserves
- Provide technical advice and assist the community in the preparation of their fisheries management plans and activities, e.g. on the maintenance and management of fish reserves and creation of village by-laws for better management of their marine resources.

Scholarships Funded by the FETP for existing staff

COURSE	**INSTITUTION**	**PERIOD**	**CANDIDATE**
MSc	USP, Fiji	Jul 95-ongoing	Lui Bell, PFO
MSc (Fisheries)	Aust.Maritime College	Jul 96 to Jun.97	Antonio Mulipola, SRO

9. VEHICLES

As reported in the previous annual report, there were only four vehicles used for Fisheries Division activities. One of these vehicles was still used in Savaii for their activities and other three were based in Apia. All four vehicles were donated by USAID in 1992. The details for the use of the Fisheries Division vehicles that were operational during the year are shown in Table 9.

Table 9: Details on Fisheries Vehicles use during the 1995/1996 period

Vehicle Plate Number	Location	Type & Model	Year of Purchase	Funding Source	Remarks
Govt. 9031	Apia: Administration	Isuzu double- cap pickup	1992	USAID	Office
Govt. 9029	Apia: Aquaculture & Research	Isuzu single-cap pickup	1992	USAID	Fisheries Statistics, giant clam, fresh water fish farming projects.
Govt. 9479	Apia: Development	Isuzu single-cap pickup	1992	USAID	FAD and Exploratory Fishing Projects
Govt. 9030	Asau	Isuzu single-cap pickup	1992	USAID	Exploratory & Office use

10. FISHERIES DIVISION FISHING BOATS

10.1 Tautai Matapalapala

This vessel was granted through the United States Aid Package in 1988. The vessel has been used mainly for Fish Aggregating Devices deployment, monitoring and maintenance, and the execution of fishing trials and surveys. The vessel had been maintained in good condition and so far it had not encountered any major problems. Tautai Matapalapala had undertook a total of 17 trips ranging from one to three days duration, during the period.

10.2 Tautai Iapani

Tautai Iapani is a 28ft aluminium alia powered by a 75 HP Mariner Outboard Motor. The alia is based in Asau and had been having some problems with its motor. Spareparts had to be ordered from overseas as they were not readily available with the local agents. The boat had been used mainly for conducting experimental fishing and serve as the platform for demonstration of fishing methods and training Savaii fishermen.

11. FISHERMEN FUEL SUBSIDY

Fisheries Division continued to issue permits to locally registered fishermen for the purchase of pre-mixed fuel for fishing. The issuance of permits to fishermen for the purchases of pre-mixed fuel entitles the fishermen for fuel subsidy which is a refund of the duty on imported fuel. Table 10 summarises sales of pre-mixed fuel by area of origin of alia owner as taken from Fisheries Division records.

Table 10: Sale of pre-mixed fuel during the July 1995/June 1996 period.

UPOLU ISLAND				SAVAII ISLAND		
ALIA OWNER VILLAGE	**NO. OF 44 GAL**	**SUBSIDY BY GOVT. (WST)**		**ALIA OWNER VILLAGE**	**NO. OF 44 GAL**	**SUBSIDY BY GOVT. (WST)**
Apia	752	26,395.20		Auala	43	1509.30
Apolima	131	4,598.10		Sataua	170	5967.00
Aleipata	45	1,579.50		Safotu	58	2305.80
Faleasiu	86	3,018.60		Samalaeulu	97	3404.70
Falefa	47	1,649.70		Salailua	138	4843.80
Falealili	362	12,706.20		Salelologa	55	1930.50
Lotopa	70	2,457.00		Palauli	73	2562.30
Lepea	98	3,439.80		Sagone	131	4598.10
Laulii	58	2,035.80		Lalomalava	246	8634.60
Lufilufi	65	2,281.50		Foaluga	81	2843.10
Papauta	205	7,195.50				
Pesega	67	2,351.70				
Saoluafata	52	1,825.20				
Siumu	267	9,371.70				
Tanumalala	358	12,565.80				
Vaivase	138	4,843.80				
Vailima	197	6,914.70				
TOTAL	**2,998**	**105,229.80**		**TOTAL**	**1,092**	**38,599.20**

The table indicates that fisherman on Upolu used more than twice as much fuel as fishermen on Savaii. This difference is due mainly to the greater number of alias on Upolu. On Upolu, the most prominent fishermen are from Apia, Falealili, Tanumalala, Siumu and Papauta. On Savaii, the more prominent fishermen are from Lalomalava, Sataua, Salailua and Sagone.

12. MECHANIC WORKSHOP

The Mechanic Workshop continued to provide services in the repair of outboard engines for the local fishermen at $10 per repair work regardless of the magnitude and nature of the repair. Most of the time was spent on repairing outboard engines which were mainly of the E40GHP Yamaha model. Records of engines repaired indicate that more than 90% of the fishermen were using 40HP outboard motors, with the Yamaha model been the main engine. The other 10% account for other make, like Johnson, Mariner and Evenrude models. It is noted that some fishermen are starting to use more powerful outboard motors, 75HP up to 150 HP. Other repair work include repairs of lawn mower, chain saws and water pump generators. Servicing of the fisheries vehicles and the fishing vessel Tautai Matapalapala were also conducted.

Revenue generated from the services involving the workshop has been very minimal due to the arrangement of charges imposed. Fisheries Division is considering re-assessment of this arrangement so that repair charges would reflect the magnitude and nature of the repair required.

ACKNOWLEDGMENT

The Fisheries Division wishes to record its thanks and appreciation to the following Governments and Regional Agencies for the kind assistance provided to the development of fisheries in Western Samoa during the year through the services of Consultants, services of Volunteers, supply of materials, supply of valuable information, funding Fisheries Division participation to Meetings and Trainings, provision of technical advises and many others:

1. Government of Australia
2. Food and Agriculture Organisation (FAO)

3. Forum Fisheries Agency (FFA)
4. Government of New Zealand
5. South Pacific Aquaculture Development Project (SPADP)
6. South Pacific Commission (SPC)
7. United Nations Development Programme (UNDP)

Thanks are due to the various local Government Departments in particular the Ministry of Foreign Affairs for positive attitude shown to various matters requested by the Fisheries Division.

Lastly, but not least, thanks are extended to our Minister, Director, Deputy Director and Divisional Heads for the support they have given to the Fisheries Division throughout the 1995/1996 year period.

APPENDIX 1

Overseas short courses, attachments workshops

COURSE	PERIOD	LOCATION	ATTENDEES	COMMENTS
Ext. Officer course	13/2 to 28/7/95	Nelson, NZ	Patelesio Taualofa	SPC/funded
SPC Fisheries w/shop	22/6 to 95	New Caledonia	T.Mulipola, E.Ropeti S. Iosefa	FETP SPC funded
Coastal Management	31/7 to 8/9/95	Fiji	Tavita Sasi	IOI- USP/funded
Tilapia Farming w/shop	17 to 27/10/95	Fiji Vaauli Tulitua	Patelesio Taualofa	SPADPfunded
Hatchery w/shop	27/9 to 27/10/95	Indonesia	Tony Mulipola	TCDC funded
Aquaculture w/shop	29/10-2/11/95	Tonga	Lui Bell	SPADP
Computer w/shop	2 weeks Dec 95	Solomon Is.	A.Mulipola Malama Siamomua	FETP(1) FFA
Coral Reef Initiative	5-9-11/95	Suva	Lui Bell	SPREP
Fisheries Dev. W/shop	22/11 to 22/12/95	PNG	Ameto Kalolo	JICA/funded
Fisheries Admin.Course	2weeks Jan 96	Fiji	U.Faasili, E.Ropeti	FFA
MSc attachment	2weeks Feb/96	Suva	Lui Bell	WSFETP
FEO course	9/2/96 -	Nelson, NZ	Autalavou Taua	SPC
Small Bus. Ent.	2 wks Feb/Mar.96	Vanuatu	Ioane Mulipola	SPC
Integrated Fish Farming Course	Apr-July 96	China	Patelesio Taualofa	Samoan & Chinese Govts