FISHERIES DIVISION

ANNUAL REPORT
July 2000-June 2001

A. Mulipola, S. Time E. Ropeti, A. Trevor, M. Lober & T. Ualolo

August, 2001

Apia, Samoa

TABLE OF CONTENTS

MISSION STATEMENT

The Fisheries Division is committed to the Vision, Goal and Objectives identified in both the Statement of Economic Strategy and the Ministry's Corporate Plan (2001-2004), and has established the following as its Mission.

To take actions that promotes the optimum and ecologically sustainable utilization of the country's fishery resources.

HIGHLIGHTS

The following highlights represent the achievements the Fisheries during the fiscal year.

- ***Establishment of the Tuna Fishery Management Plan:*** Cabinet in September, 1999 approved the tuna management plan to regulate the fishing effort by restricting the number of vessels allowed to fish within Samoa's Exclusive Economic Zone. The Fishery Management Plan consists of four categories based on vessel size. Category A consists of 9 meters and smaller vessels, Category B are 9 to 12 meters, Category C are between 12 and 15 meters and Category D are 15 meters and bigger. The number of vessels for each category is as follows; Category A-unlimited, Category B-25, Category C-15 and Category D-8. In January 2001, this FMP was amended by Cabinet increasing the number of vessels in Category D to 15

- ***New regulation for the Tuna management plan:*** Fisheries Fishing License Regulations 2001was drafted in consultation with the key players in the tuna fishing industry. The regulation includes criteria for obtaining a fishing license, terms and conditions of the fishing license, penalties plus all other aspects pertaining to the FMP and related issues. The final draft of this regulation is now with Cabinet for approval before being submitted to the Head of States for his signature..

- ***Establishment of National Seafood Monitoring Programme:*** The main objective of the project is to establish a National Seafood Authority which monitors the activities of local fish processors to ensure that the problem of inferior fish and fish products is addressed hence resulting in minimal rejection from our foreign market. Samoa lost about ST$700,000 in 2000 due mainly to fish export rejection. In order to avoid a repeat of this loss, Samoa's fish products should meet the standards that are expected by the international seafood community. This project is now into its second and final phase with further funding by NZODA. A final draft License for Fish Processing Establishment regulation is now with Cabinet for approval. This regulation further elaborates on the issue of quality control and compliance by ensuring that all fish processing establishments comply with the standards that are required by the National Seafood Authority.

- ***Positive result achieved by Ulimasao during fishing trials:*** After 20 trips conducted by the R.V. Ulimasao, a total of 15, 960 kilograms of fish were caught and was worth SAT$71,810. Based on the twenty trips, a simulation was carried out for a year long trial period and has shown that RV Ulimasao could generate an income around the ST$80,000 mark. This indicates that the vessel is economically viable. Further trials are continuing to ensure that any technical defects by the desgn-manufacture of the prototype is detected and rectified.

- ***Compliance with Sea safety and Licensing Regulation improved:*** Positive response from the boat owners/fishermen to the work of the enforcement committee result in 134 boats issued with sea safety certificates from the Ministry of Transport and 91 were issued with fishing licenses. This is about 65% of the estimated operational fleet.

- ***Domestic landed fisheries***: Approximately 128 mt of both inshore and offshore originated fresh finfishes and invertebrates valued at about $810 thousands tala were landed and sold commercially at domestic outlets, especially at the Apia Fish Market. Offshore fishery product accounted for more that 70%. The overall fishery landing for 2000/2001 has decreased by about 50% compared to last year.

- ***Tuna Export tops foreign earning for Samoa:*** The total exports of 4505 tons for 2000 showed an increase of over 100 tons from 1999. Total export value was recorded at SAT$39 million with an increase of SAT$11. 5 million from 1999's figure. This represents 60% of total export earning for Samoa. The volumes and values were generated from receipts of declared items submitted to Fisheries Division, Central Bank and Custom Department.

- ***High Rejection of tuna from the canneries in American Samoa is at its alarming rate:*** A total of 104.7 tons of albacore were rejected from the canneries in American Samoa. This posted a loss in revenue earning of over SAT$700,000. 00. This is an indication of poor domestic quality control resulting in the export of inferior fish and fish products.

- ***Subsistence fisheries:*** A subsistence household survey covered 20% of villages and a 5% of Samoa's households estimated the total subsistence seafood catch for the year 2000 as 7,169 tons. It is valued at about ST45 million. The total seafood consumption for the country is estimated as 9,971 tons and worth over ST62 million per year, ST45 million of which is caught by village fishers. Together with fishery exports, the gross value of Samoa's marine resources is around ST100 million (approximately USD27 million) per year.

- ***Aquaculture:*** In the Aquaculture development, the Tilapia hatchery has a production rate of about 6,000 fry and broodstock of various sizes. Approximately 1000 broodstock were stocked into village lakes/stream/ponds while 2000 fry were used for a high-density stocking and monosex culture trial. Several spawning runs of *T. derasa, T. maxima* and *H. hippopus* were conducted at Toloa Hatchery which resulted in the production of 11,000 seedlings of *T.derasa* faisua. More than 4,000 bivalve seedlings of tugane, pae and pipi were translocated to selected sites for seeding purposes. Furthermore, farming of mudcrab was also investigated with positive results.

- ***Community-based fisheries management:*** Ten new villages with approved Management Plans was achieved during this twelve-month period. These included four in Savaii and six in Upolu Island. The facilitation process in producing Management Plans for these villages took 5-6 weeks before approval by various village councils (fono).

- ***Village Management Plan Review:*** A total of 60 reviews of Village Management Plans in Upolu and 35 in Savaii were implemented during the last twelve months. Moreover, 6 media releases were produced and distributed to the local TV, newspapers and radio stations. A total of 11 new bylaws are in the formulation process with 6 of them awaiting final approval by various authorities.

- ***Fish market services:*** An average of 14,000 fishers and vendors have used the open or the public side of the Apia Fish Market to trade their fishery products during the year. From the table/block renting, it generated a total of $60, 772.

ACTIVITIES

Research, Assessment and Management Support Services

The activities of the Research, Assessment and Management Support Services had focussed on the areas of Fisheries Resource Assessment, Aquaculture, and Fisheries Statistics as detail in Appendix 2 & 4.

Biodiversity and Habitat Assessment in MPA

The aquaculture activity was mainly concentrated on the promotion and production of tilapia (*Oreochromis niloticus*), giant clams (*Tridacna derasa, T.maxima, and Hippopus hippopus)* and translocation of selected local shellfishes (*Anadara, etc.)*. The tilapia breeding programme resulted in the production o about 6,000 broodstock being distributed and stocked in village lakes/streams/ponds and cages/fences. Additionally, tilapia promotional activity saw several methods of cultures, namely fence/pen and cages have been experimented. On the giant clam propagation activity, successful spawning runs of *T. derasa, T. squamosa* and *H. hippopus* had resulted in the production of 11,000 seedlings now ready for distribution to village lagoon nurseries for stock enhancement purpose.

On the Resource Assessment activity, the status of the fisheries was investigated as one of the main tasks. Through this activity, the status of the biodiversity (fish and invertebrates) particularly in Marine Protected Areas (MPA) and surrounding habitats were monitored, assessed and resurveyed. Moreover, translocation of selected local bivalves species of pae (*Anadara* sp.), pipi (*Asaphis* and tugane (*Gafrarium tumidum*) was also investigated and researched to determine their growth for the purposes of promoting stock enhancement in resource depleted regions.

The collection, compilation and analysis of fisheries statistics have always been one of the primary functions of the Research Section of the Fisheries Division. Catch and effort data were collected from surveys and sampling of fishery products landed and sold at several domestic outlets as well as the export of offshore-caught fish and fish for faaoso purposes. The data are then checked and verified before entering into the Fisheries Database System developed in ACCESS. Data are then analysed and summarised to generate reports and estimates of fish productions (landings and values) in subsistence and commercial fisheries, inshore and offshore, major targeted species and the estimate of fisheries contribution to the economy of the country.

Data collection at the Fish Market

Commercial Fisheries Extension Services

The activities of the Commercial Fisheries Extension Services include the establishment of a Tuna Fishery Management Plan, Exploratory fishing, Super-Alia Protoype Fishing Trial, Fishermen radio communication network, Registration and licensing of fishing vessels, enforcement of fishing regulations and the servicing of the Commercial Fisheries Management Advisory Committee (CF-MAC). Appendix 2 and 3 provided more details of these services.

Local fishing fleet moored at Fisheries wharf

A Fishery Management Plan(FMP) was adopted and approved by Cabinet which regulate the fishing effort by restricting the number of vessels allowed to fish in the EEZ of Samoa. The FMP is based mainly on economic and safety reasons with minimal bearing on the biology of the stocks.

A National Seafood Monitoring Programme was initiated during the period intending to address the problem of tuna rejects exported from Samoa. This is to protect the fishing industry from rogue fish exporters that do not comply with international seafood safety requirement.

The new prototype, super-alia, Ulimasao was completed in early 2000. This was followed by an economic viability and seaworthiness investigation which was conducted for a period of 6 months where several fishing trips were undertaken.

The Commercial Fisheries Section also registered and licensed local fishing boats fishing in Samoa's EEZ and has continuously promoted safety at sea in close collaboration with the Police and MOT. This effort resulted in the issuance of seaworthiness certificates to 134 boats where 91 were issued with local fishing licenses.

Fisheries Extension Advisory Services

The Fisheries Extension Advisory Services create the opportunity for the Fisheries staff to work closely with village communities and encourages them to actively engage in the management of their respective fisheries and marine environment. The section has worked with 10 villages facilitating in the development and the formulation of fisheries management plans.

Staff of the section has carried out more than 90 reviews of existed village management plans and village performance with respect to the identified undertakings. Moreover the section has assisted in formulating 11 new bylaws which are in the process of adoption.

Several training and workshops were conducted for communities in support of linking community-based management to stock enhancement and generating awareness in conserving Samoa's exhausted fishery resources. Appendix 5 provided more information on the fisheries Extension Advisory Services.

Fish Market Service

Tuna landed at the market.

The Fish Market continued to service the general public in particularly local fishers that sell their fishery products daily at the open side of the market. They looked after the cleanliness of the site and collect revenue for government through table rents. The revenue collected was $60,772 during the twelve months, which is over the forecasted amount of $60,000.

Additionally, Authorised Fisheries Officers have carried out regular monitoring and enforcement of the size limits regulation ensuring those illegal undersized fishes and invertebrates are not landed and sold through the market.

Appendix 6 provided more information on the Fish Market.

Regional and International fisheries matters

Samoa is a member of the Forum Fisheries Agency whose committee, the Forum Fisheries Committee meets on an annual basis unless there are emergency issues that warrants a special FFC to convene.

One of the issues is the multilateral fishing agreement with the US that allows purse seiners from the US to fish in the eezs of the FFA member countries. This agreement expires in February 2003 and negotiations are currently underway to extend this agreement for a possible 5 or 10 years with slight modifications to the terms and conditions which should be mutually agreed to by the negotiating parties. To date, Samoa earns total of 2.7 million US dollars under the current treaty arrangements.

The Multilateral High Level Conference (MHLC) adopted the Convention for the management of highly migratory fish stocks in the Western and Central Pacific Ocean during its final session in 2000. The process is now in its preparatory phase that prepares for the establishment of the structure, procedures and finances of the commission ready for implementation. The Commission site is yet to be determined and it is hoped that this issue will be finalized during the next preparatory conference to be convened in March 2002 and hosted by Papua New Guinea.

Training and Workshops

A number of trainings and workshops have been carried out by the Fisheries Division to address issues pertaining to enforcement and regulations, management, research, aquaculture, fishing technologies, quality control, computer, statistics, as well as safety at sea. Details of training offered by the Fisheries Division and those attended by staff of the Division are summarized in Appendix 7.

Challenges

The past fiscal year period was very challenging for the Fisheries Division as efforts and resources were directed towards the proper implementation of the Fishery Management Plan that sometimes proved to be beyond the mandated authority vested within the Division. The issue of safety at sea was difficult to contain in the desirable level due to the lack of available resources that allows the Division to gain an upper hand on an industry that continues to grow at an exponential rate. The collaboration by responsible government agencies slacks off at times further jeopardizing the enforcement and regulation procedures. Even more challenging is the fact that the latent capacity and the full economic potential to the country of the domestic industry is ready to manifest itself, but our anticipated management procedures are very limited due mainly to the restricted resources and mandate afforded to the Fisheries Division to undertake such a huge responsibility.

Procure stores and payment systems as imposed by the Treasury Department has again a major hindering factor slowing the achievement of some of the Division scheduled tasks. Though the reformed procedures have been implemented, somehow obtaining goods in a timely manner was still difficult.

The general lack of incentives and reward available such as salary promotional for staff has often contributed to staff turnover and their lack of motivational, hence attributed to the general performance inefficiencies and low output results.

The Ministry is too large and the load may not be fair to the Director. This has often caused loss of communications and resulted in repeated reproduction of documents.

Recommendation

The domestic tuna industry became Samoa's number one export earner after three years of development and continues at this level to date. In 2000, the export earning was reported at ST$39 millions which has a huge potential for increase if the industry was given room to dissipate its full fishing capacity. The positive economic ramifications to the country of the full domestic fishing capacity if allowed to be dissipated should be taken seriously by the local government.

Recognizing the significance impact to the local economy of a full blown industry, the Fisheries Division should be given special treatment management-wise to allow for the smooth and expeditious implementation of desirable activities.

Acknowledgement

The Fisheries Division wishes to acknowledge the invaluable contribution from the following agencies:

- Government of Australia (AusAID)
- Food and Agriculture Organization (FAO)
- Forum Fisheries Agency (FFA)
- Secretariat for the Pacific Community (SPC)
- Japan International Cooperation Agency (JICA)
- South Pacific Regional Environment Program (SPREP)
- University of the South Pacific – Marine Studies
- Government of New Zealand (NZODA)

For local contributions, the support of the Foreign Affairs, Public Service Commission, Attorney General, Ministry of Transport, Police Department and Treasury were appreciated. Supports from other Divisions of MAFFM, other Government Departments and Non Governmental Organizations are greatly appreciated.

Our stakeholders and industry partners have contributed in so many ways to ensure that our management regimes are industry driven with minimal government input and guidance.

Throughout the year, the AusAID Fisheries staff, the Team Leader and Advisors have contributed significantly to the forwarded movements of the Fisheries Division in meeting its expected and planned targets. I also acknowledge the dedication, commitment and cooperation by my staff, in particular, the Senior Officers that have driven the Fisheries Division to the stage, as it is now recognized.

Last but not least I acknowledge the support of the Honorable Minister and Director ensuring that we have achieved our mandated responsibilities.

Dan Su'a
ASSISTANT DIRECTOR, Fisheries Division

APPENDIX 1. Sub Output 15.1 – Registration, licensing and surveillance services

1 The events in the following report were the achievements of programmed activities under the Sub-output 15.1 of the Output 15.0.

Locally based fishing fleets

Registration and licensing

2 Under the Fisheries Act 1988 section 5A all commercial fishing vessels must be registered and have a valid fishing license to operate in Samoa fishing water. In the Tuna Fisheries Management plan approved by cabinet in September 2000 fishing vessels were classified in four categories (Table 1) according to overall length with the number of fishing licenses limited in three classes.

Table 1: *Categories of locally based fishing vessels and limited number of licenses in 2000/2001*

CLASS	LENGTH	NUMBER OF LICENSES
A	8 to less than 10 metres	No limit
B	10 to less than 12.5 metres	25
C	12. to less than 15 metres	15
D	15 metres and over	15

3 Despite the enormous effort by the Division to encourage the boat owners to have their boats registered and obtained a fishing license the response is not very encouraging. The Ministry of Transport encounters a similar problem in trying to have their boats surveyed for their safety. The Ministry of Transport demands for the safety of the fishing boats and the crews while the Ministry of Agriculture, Forests, Fisheries & Meteorology needs the licensing to base management decision of the resource. An estimate of 60% of the entire local fleet (Table 2) was issued with fishing licenses this financial year. The only foreign fishing vessel *Faivaimoana* had its fishing license expired in December 2000 did not renew it this year.

Table 2: *Number of local fishing vessels licensed in 2000/2001 period*

BOAT CLASS	NUMBER OF BOATS LICENSED - 2000/2001
A	60
B	22
C	6
D	9
TOTAL	**97**

Surveillance and Monitoring

4 Surveillance activities continued throughout the period both at the Fish and Fugalei Markets for the sale of undersized and prohibited fish species. Surface surveillance has been conducted by the Police Patrol boat Nafanua while aerial surveillance has been handled by the assistance of Australian and New Zealand Royal Air Force. No infringement was reported which indicated the absence of any illegal foreign activities in our EEZ.

Fishermen Safety at Sea Radio Communication Network

5 The contribution of the Fishermen Safety at Sea Communication Network is no doubt very important to the safety of the fishermen and the development of the commercial fishery. The 24-hour services throughout the year enable the fishermen and the users to free access to the network whenever there is a need. The fishing boats under the conditions of their fishing licenses require to reporting to the base:

(i) Their departure and intended fishing ground.
(ii) Setting and completion time.
(iii) Hauling and completion time.
(iv) ETA and arrival time

6 The establishment of the network in 1997 had really brought down the number of lives lost at sea and facilitated the coordination of search and rescue for distressed vessels needing assistance. The upgrading of the system in early last year saw the addition of four new channels for the Upolu fleet and two for Savaii area. The maintenance of the Network by the Pro Com System has been very efficient. The network had some minor problems due to unexpected power cut and heavy lighting. However Pro Com was enabled to attend to the problem and keep the system operational when they were informed.

7 During this fiscal year the Network received calls and reports from 27 fishing vessels requiring assistance. Their problems were sought through contacting their owners and other vessels in the vicinity or with the help of the police patrol boat Nafanua. The main problems being engine failures. They are required to carry necessary spare parts and spare engines. Two fishermen were recorded lost in this period.

Enforcement of Sea Safety Regulations

8 The successful development of the Tuna long line fishery in Samoa did not escape from the common problems associated with this type of fishery. Since 1966 when the long line fishery drawn a lot of interests not only from the local business group but the foreign investor as well, a total of 33 lives and 9 fishing boats were lost. The main reasons behind this were, the boats were not sea worthiness and equipped with proper safety gears, and the skipper and crews were not certified to handle the boats and make fair decision when problems come up in the open ocean.

9 This prompted the Surveillance Committee to appoint an Enforcement Sub Committee to enforce compliance with Sea safety requirements and fishing licensing. The Enforcement Sub Committee comprises members from the Ministry of Transport, Police Department and the Fisheries Division.

10 After sitting in series of meetings the campaign plan was drawn and the committee be called Monitoring, Control and Surveillance committee. The action plan was implemented on the 1st July 2000. Implementation commenced with giving out notices on the TV Samoa and 2AP advising boat owners to have their boats surveyed for safety, have their crews certified and be given with a fishing license. Panel discussion was also aired and the boat owners were given with letters of warning. Towards the end of 2000 the committee made enforcement inspection in the port of Apia. The response from the boat owners was fairly good.

11 Inspection was slowed down during the year-end holidays and the election in the beginning of the 2001, and was revitalized in May 2001. The response at this time was even better and there were cases almost end up in the decision of the court. As a result more than 50 boats were surveyed for safety and 22 were issued with fishing licenses. The committee is now planning to move the enforcement inspection to outside ports from Apia and to carry out field surveillance using the *Nafanua* patrol boat.

Fisheries Wharf Safety Committee

12 Taking into consideration the numerous activities taking place at the Fisheries wharf plus its congestion situation put the safety of those using the wharf and the fishing boats at risk should a fire sparks. The danger it poses requires remedial measures and safety precautions to advise the public.

13 A committee was formed comprising members from the Fire Services of the Police Department, Ministry of Transport, Samoa Port Authority, Ocean Fuel Depot and Fisheries Division. To alleviate the problem and to enforce government policies and regulations the committee under the auspices of the CF-MAC met and discussed at length ways to remedy the situation. At the same time enforcing government policies and publicizes safety precautions to advise the public especially those using the wharf. Notices were broadcast on radios and put through TV Samoa several times and finally written on board now displayed at the Fish market and on the wharf in both Samoan and English.

Commercial Fisheries

Summary:

14 With the Commercial Fisheries Management Advisory Committee in existence since late 1999, three meetings have been convened during this fiscal year. The Committee, which comprises of different stakeholders from both government and private sector, has the main objective of encouraging the participation of the private sector in the fisheries management decision-making process to ensure the sustainable exploitation of the tuna resources. Appendix 8 explains the activities of the section in more details.

Commercial Fisheries Management Advisory Committee (CF-MAC)

13. There has been and is a rapidly growing interest in the fishing industry particularly, the tuna longline fishery. This has created a heavy workload and consequently a handful of issues that were addressed by the committee to manage and develop the longline fishery. A total of 4 meetings were convened throughout the year, giving an overall total of 11 meetings so far conducted since its establishment in 1999.

14. A number of significant achievements evolving as recommendations of the committee included the official approval by Cabinet and enactment of the Management Plan for the tuna fishing industry, and the drafting of the Regulations that coincide with it. In addition, the fishermen fuel depot was completed and became functional in October 2000. The new marina for the commercial fishing fleet as proposed at Mulinuu point is still under consideration. There have been rejection problems resulting from the poor quality of tuna that were exported to the canneries in Pago Pago. To address these, the National Seafood Safety Monitoring Program which is to be implemented has completed its consultation phase in December. This established the guidelines and regulations to monitor seafood safety within the country. Some of the other major issues raised and discussed included:

- Funding of the new marina by the Chinese government
- High rejection rates from the canneries in Pago Pago
- Starkist Loining Plant proposed for Savaii
- Reciprocal Fishing Agreements with neighboring countries
- Sea Safety Regulations Enforcement
- Navigation markers for the rural ports

- National Seafood Safety Monitoring Program

Information Sheets/Newsletters

15. The Commercial Fisheries Extension Service has continued to freely provide and disseminate relevant information from around the country and the region to keep members of the fishing industry informed and up-to-date of how it's progressing. So far, 4 editions of the quarterly Samoa's Longline Newsletter have been published. This publication has generated a fair response and interest from the target audience. The summary of all activities that was carried out by the Commercial Fisheries Extension Services during the period is listed in Attachment 9.

Future Activities

- Update and maintain records of all fishing vessels (both licensed and unlicensed)
- Liase with the Ministry of Transport on safety issues for vessel registration and licensing
- Liase with the Police Department on enforcement of Fisheries Regulations
- Cooperate with the Police Department on offshore surveillance
- Participate in aerial surveillance when required
- Monitor good record of the Foreign fishing vessel licensing
- Continue to provide and strengthen the vital service for the fishermen and the vessel owners
- Closely monitor the daily operation of the Radio Communication Network
- Liase with the pPolice Department on the use of the patrol vessel for rescue missions
- Continue to monitor the sale of under-sized fish and prohibited fish species at the market places

Fisheries Regulation Enforcement (Size limits)

16. The enforcement of the Local Fisheries Regulations on Size Limits was originated in the year 1995 but was enhanced with full force in 1999 -2000. Fisheries Authorized Officers that has undertaken training on investigation, reporting and prosecution enforce the regulation. The regulation is daily monitored in the Apia Fish Market seven days a week and at Fugalei Market on three 3 days a week/week on an hourly basis. Enforcement routinely carried outs from 6:00am to 4:35pm week days and Saturdays from 4:00am till 11:00am and Sunday from 4:00am to 8:00am. Several awareness campaigns were conducted for the public through media channels (TV spots, radio ads and press releases).

17. Overall there were 94 cases reported in the year 2000 inclusive of the 8 cases filed and prosecuted in the Apia District Court. The eight cases were already heard and offenders were sentencing. In January-June 2001, there were 109 cases reported and 5 were filed at the Justice department. The rest of the cases were first offenders were briefed and warned. Additionally, there were two By law cases investigated and in the process of filing it in court for prosecution.

APPENDIX 2. Sub Output 15.2 - Fisheries stocks, Statistics and Information services

18. The results of activities reported in this section falls under the Sub-output 15.2 of the Output 15.0. The collection, collating and compilation of fishery statistics and related information were some of the ongoing activities performed by the Research Unit throughout the year. Importantly, the ongoing collection of data and information was to facilitate the monitoring of fisheries exploitable resources over time. In the outcome, proper and effective measures are to be identified ensuring the sustainable and ecological management of Samoa's fishery resources.

19. The ongoing data collection involved the sampling of fishery landings and efforts of different fisheries. Data was obtained via surveys conducted regularly, periodically and randomly at various outlets (i.e. Apia Fish market, Salelologa Market, retailers, landing ports, etc.). During sampling, major taxa (families to species) of fishes and invertebrates were identified and recorded. The lengths and weights were measured and weighed and numbers for each species being counted to determine the species composition.

20. Additional information pertaining to economic value and fishing effort (fishing hours, location, fuel consumption, number of crew, fishing methods, etc.) was also obtained from interviewing sellers, proprietors and vendors. Data and related information were verified and entered into a central Fisheries database system developed using Microsoft ACCESS.

21. With most surveys are ongoing activities every year, the following data collection activities were implemented in the 2000/2001 fiscal year period.
    (a) Offshore tuna fishery suurvey
    (b) Offshore bottomfish fishery survey.
    (c) Inshore fishery survey.
    (d) Apolima landing site survey.
    (e) Longline port samplings.
    (f) Fugalei market and Roadside fishery surveys.
    (g) Commercial & Faaoso Export

Domestic commercial/artisanal fisheries landings

22. During the fiscal year period of 2000/2001, a total of about 128 mt of inshore and offshore originated finfishes and invertebrates was landed and sold commercially at domestic outlets Samoa, in particularly the Apia Fish Market. The total volume was estimated to be worth approximately $810 thousands tala. Offshore fishery products accounted for more than 70% of the total domestic fishery landings. Table 3. summarises the overall estimated total of fishery products, which were domestically landed and sold fresh and processed.

23. In contrast to the 1999/2000 fiscal period, the total volume of locally landed and sold fresh fishery products was significantly lowered by about 50%. Inshore and offshore originated products were both declined by more than 50% respectively. The overall decreased in total volumes was mainly due to the decrease in the landed volume of inshore items because of the enforcement of the size limit regulations as well as the increasing in export of fresh and frozen tuna and bottomfish in 2000/2001 period.

***Table 3**: Total estimates of volume and value of domestic sold fisheries*

Fishery	Est Wt (mt)	Est Val ('000t)	% Wt
Inshore	35.1	395.2*	27.4
Offshore	92.6	414.4	72.6
Total	**127.7**	**809.6**	

*including values of the non quantified processed items sold via Fugalei Agriculture Market.

Offshore fisheries

23 The information gathered in the survey of the Apolima Landing Site Survey and the Apia Fishmarket Offshore Survey was raised to generate estimates of the total weights and values of Offshore Fish sold locally during the fiscal year period. In total, the estimated weight of offshore fish sales was about 92,661 kg, with an estimated value of $414,472. Table 4 details the domestically landed and sold offshore fisheries by major group in 2000/2001 period.

***Table 4:** Domestic sold offshore fisheries by major groups*

Fishery	Est Wt (mt)	Est Val ('000)	$/kg	% Wt
Tuna & other pelagics	51.9	179.1	3.4	56%
Billfishes	11.4	37.8	3.3	12%
Deepwater	28.6	197.0	6.8	31%
Total	**91.9**	**413.9**		

24 Skipjack (*Katsuwonus pelamis*) dominated offshore fish types landed and sold at domestic outlets, which comprised 32.62% of the total weight of offshore fish (pelagic plus Bottomfish), sold. In terms of pelagic fish sales, the sale of Skipjack amounted to about 58% of the estimated total weight. Other pelagic fish (tuna and other commercially valued fish) collectively made up 23.32%, while Billfishes comprised 12.4% of the total weight of offshore fish surveyed throughout the fiscal year. Tables 5 and 6 show the weights and percentages of the different species that make up these groups. These represent approximately 69% of the total offshore fish sales.

***Table 5:** Estimated Total Weights, Values, and Percentage Composition of Billfishes.*

Common Name	Scientific Name	Est wt	Est value	$/kg	% wt
Blue marlin	*Makaira mazara*	7,250.37	19,626.46	2.71	7.8
Unspecified marlin		1,779.66	8,398.40	4.72	1.9
Black marlin	*Makaira indica*	1,423.20	6,351.00	4.46	1.5
Shortbill spearfish	*Tetrapturus angustirostris*	695.49	1,914.00	2.75	0.7
Striped marlin	*Tetrapturus audax*	245.92	1,322.40	5.38	0.3
Broadbill swordfish	*Xiphias gladius*	62.64	243.6	3.89	0.07
TOTAL		**11,457.29**	**37,855.86**	**3.3**	**12.3**

Table 6: *Estimated Total Weights, Values, and Percentage Composition of Pelagics.*

Common Name	Scientific Name	Est wt (kg)	Est value (ST)	$/kg	% wt
Skipjack	*Katsuwonus pelamis*	30,227.37	104,412.85	3.5	32.6
Yellowfin	*Thunnus albacares*	11,351.99	39,731.83	3.5	12.2
Dolphinfish	*Coryphena hippurus*	2,880.81	8,921.72	3.1	3.1
Albacore	*Thunnus alalunga*	2,496.30	7,887.61	3.2	2.6
Bigeye barracuda	*Sphyraena forsteri*	1,597.70	6,850.59	4.3	1.7
Wahoo	*Acanthocybium solandri*	1,055.24	3,596.00	3.4	1.1
Bigeye tuna	*Thunnus obesus*	765.84	2,728.32	3.6	0.8
Pomfret	*Taractichthys steindachneri*	459.98	1,512.64	3.3	0.4
Unspecified Shark		260.51	316.26	1.2	0.2
Bigeye thresher shark	*Alopias superciliosus*	260.3	389.76	1.5	0.2
Dogtooth tuna	*Gymnosarda unicolor*	180.53	638.02	3.5	0.2
Moonfish	*Lampris guttatus*	140.8	487.2	3.5	0.1
Blacktip reef shark	*Carcharhinus melanopterus*	120.64	371.2	3.1	0.1
Rainbow runner	*Elagatis bipinulatus*	102.5	804.48	7.8	0.1
Blue shark	*Prionace glauca*	85.19	417.6	4.9	0.09
Longtail tuna	*Thunnus tonggol*	3.89	39.44	10.1	0.004
TOTAL		**51,989.59**	**179,105.52**	**3.4**	**56.1**

25 The estimated weights made up by some of the more common family groups of bottomfishes, are presented in Table 7. Collectively, these groups comprised about 31% of the estimated total weight of offshore fish sales. When compared with the data from the 1999-2000 fiscal year, it is seen that pelagic fish surveyed made up 15.2% less than the percentage of the same group in the 1999-2000 financial year. The percentage composition of bottomfish increased from 12% to about 27%.

Table 7*: Estimated Total Weights, Values, and Percentage Composition of deepwater fish.*

Family Name	Est wt	Est value	$/kg	% wt
Lutjanidae	16,264.49	111,091.75	6.83	17.5
Lethrinidae	9,799.25	65,290.38	6.66	10.6
Serranidae	1,631.58	11,790.69	7.23	1.7
Carangidae	990.7	6,537.41	6.60	1.6
TOTAL	**28,686.02**	**194,710.24**	**6.79**	**30.9**

Inshore fisheries

26 Reef and lagoon fresh fin-fish continue to dominated the total inshore fishery products sold through domestic outlets during the 2000/2001 fiscal year period. Finfish sold fresh either in string or individually accounted for about 80% of the total estimated landing weights of domestic inshore fisheries. Crustacean and mollusc amounted to about 13% and 6% of the total landings of inshore fishery products respectively. Overall, a total of about 35 mt of inshore fishery products was estimated being sold at local outlets mainly at the Apia Fishmarket. In contrast to last year, the estimated total landing weight is lowered by 50%. Total revenues generated from the total inshore landings for the period is estimated as $395.3 thousand tala. Again, finfish accounted for about 57% of the total value and followed by crustacean, which accounted for approximately 21% of the total value.

27 The inshore fishery products sold traditionally in cooked, bottled, wrapped and bundled in leaves forms at the Fugalei Agriculture Market generated an estimated total revenues of $71 thousand tala and accounted for about 18% of the total value of inshore products sold domestically. Because of the way these items were presented for sale, it was difficult or impossible to evaluate their quantities. Table 8 summarizes inshore fisheries by major groups sold locally during the 2000/2001 period.

***Table 8**: Domestic inshore fisheries by major groups sold at Apia fishmarket in 2000-2001*

Fishery	Est Wt (mt)	Est Val ('000)	% Wt	% Value
Fin fish	28.2	225.3	80%	57%
Crustacean	4.7	83.1	13%	21%
Invertebrates	2.2	16.2	6%	4%
Processed		70.7		18%
Total	35.1	395.3		

28 The major targeted species / families of finfish sold fresh during the period were the Unicornfish (Ume, paumalo, iliilia), Mullet (Anae), Parrotfish (Fuga, fugausi), Surgeonfish (Pone, Alogo) which accounted for 30%, 16%, 13% and 11% respectively of the total estimated weights of inshore finfish landings. Finfish was sold fresh on an average of $6.70 per kg. Table 9 records the composition of major fin fish families by estimated weights, values and mean price per kg.

***Table 9:** Finfish sold at Apia Fish market in 2000-2001 period*

Common Name	Scientific Name	Tot_Wt (kg)	Tot_Pr ($)	$/kg	% wt
Emperor – Mataeleele	*Lethrinidae*	2186.32	$ 12,545.92	$5.74	8%
Goatfish – Ululaoa, vete, taulaia	*Mullidae*	457.08	$ 2,891.45	$6.33	2%
Groupers – Gatala, ata, papa	*Serranidae*	897.62	$ 6,414.80	$7.15	3%
Parrotfish – Fuga, fugausi	*Scaridae*	3573.96	$ 25,559.77	$7.15	13%
Rabbitfish – Lo, pauulu, malava	*Siganidae*	942.84	$ 6,453.33	$6.84	3%
Snappers – malai,	*Lutjanidae*	98.10	$ 745.96	$7.60	0%
Surgeonfish – Pone, Alogo	*Acanthuridae*	3104.57	$ 23,617.15	$7.61	11%
Unicornfish – Ume, paumalo, iliilia	*Acanthuridae (Naso sp.)*	8204.17	$81,828.26	$9.97	29%
Wrasses – Sugale,	*Labridae*	1902.90	$ 13,795.16	$7.25	7%
Mullet – Anae	*Mugilidae*	4590.75	$35,038.80	$7.63	16%
Moray eels – Pusigatala	*Muraenidae (Gymnothorax sp.)*	1228.10	$11,058.49	$9.00	4%
Bigeye scad – Atule	*Selar crumenophthalmus*	570.47	$2,340.77	$4.10	2%
Other inshore fish – Isi ia		408.38	$3,059.61	$7.49	1%
Total inshore fish		**28165.28**	**$ 225,349.47**	**$6.70**	

29 Lobster (Ulasami) was the predominantly group of crustacean sold at local outlets which comprised of more than 60% of the total estimated landing volume weights. This is followed by the Mudcrab (Paalimago) group, which accounted for about 31% of the total weights. In general, crustacean generated approximately $83 thousand tala revenues and it was traded for an average price of $17.66 per kg weight. Table 10 details the major crustacean species that were disposed at local commercial outlets.

Table 10: *Crustacean sold locally in 2000-2001*

Crustacean	Scientific Name	Tot_Wt (kg)	Tot_Pr ($)	$/kg	% wt
Slipper lobster - Papata	*Parribacus caledonicus*	203.44	$454.43	$2.23	4%
Lobster - Ulasami	*Panilurus penicillatus/versicolor*	2956.18	$52,108.12	$17.63	63%
Mudcrab - Paalimago	*Scylla serrata*	1462.81	$29,459.23	$20.14	31%
Red reef crab – Paa aau	*Etisus splendidus*	10.45	$65.61	$6.28	0%
Spotted reef crab - Kuku	*Carpilius maculatus*	66.19	$845.64	$12.78	1%
Other-crabs – Isi paa		5.03	$131.22	$26.09	0%
Total crustaceans		**4704.11**	**$ 83,064.25**	$17.66	

30 Throughout the fiscal year, mollusc was sold on an average of $7.48 tala/kg in, which estimated total revenue of $16.2 thousands tala was earned. Octopus (Feé) was the dominant type of molluscs sold primarily at the fish markets. Table 11 accounts the breakdown of major types of molluscs traded at domestic markets through the fiscal year period.

Table 11: *Molluscs sold locally in 2000-2001*

Molluscs	Scientific Name	Tot_Wt (kg)	Tot_Pr ($)	$/kg	% wt
Trumpetshell - Pu	*Turbo mammorata*	6.80	$48.60	$7.15	0%
Turbanshells - Alili	*Turbo chrysostomus*	44.81	$302.36	$6.75	2%
Octopus - Feé	*Octopus sp.*	969.80	$10,689.42	$11.02	45%
Gclam maxima - Faisua	*Tridacna maxima*	1140.19	$5,135.20	$4.50	53%
Total molluscs		**2161.60**	**$ 16,175.58**	$7.48	

Processed marine products

31 The cooked and processed marine products were normally sold daily at the Fugalei Agriculture Market. The FD has conducted a sampling programme to determine the amounts and values of these fishery products sold or disposed in processed forms. The survey is carried out in conjunction with the Roadside Survey of Tugane (venusshell, *Gafrarium tumidum*). The extent of the roadside survey is from the Apia to Vailoa. Both surveys are carried out three days a week, the days being chosen randomly to ensure those days where high quantities are surveyed as well as days where lower quantities of the products are being sold.

32 Analysis of the data gathered in the surveys showed that Limu (seaweed, *Caulerpa sp*.) made up the highest estimated quantity of products sold at the Fugalei Market, comprising 36.4% of the total estimated quantity of 32,350 packages of various types and products sold. However, the product that generated the highest estimated value was Sea (sea cucumber, *Stichopus horrens*), with an estimate of $33,829.25 generated by its sales along the roadside and at the market. This product alone comprised 90.57% of the estimated total revenues made from the sale of cooked and processed marine products. The estimated total value of all products sold at the Fugalei market and in the roadside survey for the financial year ending 30th June 2001 was $37,351.76. Table 12 shows the values and quantities of products that generated the most revenues.

***Table 12**: Table of Products of Highest Values and Largest Quantities.*

Scientific Name	Samoan name	Est Total package	% of Total Qty	Avg Price	% of Total Value
Bottled *Stichopus horrens*	Sea	7884.38	21.75	$33,829.25	90.57
Cooked *Gymnothorax fimbriatus*	Faiai pusi	5795.84	15.99	$7,774.01	20.81
Bundled *Caulerpa sp.*	Limu	11789.78	32.52	$6,177.89	16.54
Cooked *Octopus sp.*	Faiai fee	4488.38	12.38	$5,957.15	15.95
Cooked fish	Afi I'a	1545.18	4.26	$4,160.10	11.14
Gafrarium tumidum	Tugane	1658.38	4.57	$3,363.46	9.00
Cooked *Dolabella auricularia*	Faiai gau	1233.88	3.40	$2,224.38	5.96
Bottled *Bohadschia marmorata*	Fugafuga	432.99	1.19	$1,913.08	5.12
Cooked *Scylomia*	Faiai matalelei	5227.01	14.42	$1,746.11	4.67
Bundled *Casssiopea sp.*	Alualu	1822.52	5.03	$1,505.56	4.03
Unspecified sea urchin	Tuitui	534.87	1.48	$1,027.29	2.75
Cooked Crab	Paa	133.01	0.37	$534.87	1.43
	Palolo	183.95	0.51	$254.70	0.68
Tripneustes gratilla	Sava'e (faaputuga)	563.17	1.55	$232.06	0.62

Fisheries Commercial Exports

33 The total export for the fiscal year period of 2000/2001 was estimated as about 4,176.5mt and valued at around SAT35.8 million. Tuna species, in particularly the albacore, yellowfin and bigeye fish dominated the total exports which accounted for 97%. Other pelagic and bottomfish accounted for 2% and 1% respectively of the total amount. The following information was extracted from the Fisheries Division Commercial Export Database based on receipts of volumes and values of exported items declared and submitted to the fisheries Division, Central Bank of Samoa and Custom Department by the exporters.

34 A total of about 4055 mt of tuna valued at ST$34.2 million (Table 13) was commercially exported during the 2000/2001 fiscal year period. Albacore (*Thunnus alalunga*) exports made up a major proportion of the tuna exports, with about 3625mt exported at an average price per kilo of SAT7.64. This amounted to SAT27.6million for Albacore exports alone and accounted for about 89% of the total exported tuna. Yellowfin (*Thunnus albacares*) and Bigeye Tuna (*Thunnus obesus*), comprised about 9% and 2% respectively were exported fresh chilled and amounted to almost 430mt valued at SAT6.5 million. Moreover, exported tuna was sold on an average cost/kg of ST$8.44.

***Table 13.** Total tuna exports by species, weight and values*

Common Name	Weight kg	% by wt	Total value (SAT)	% by Value	Avg. SAT/kg
Yellowfin	344758	9%	5330238	16%	15.46
Bigeye	85611	2%	1213155	4%	14.17
Albacore	3624703	89%	27675606	81%	7.64
TOTAL	4055072	100%	34218998	100%	8.44

35 The Other Pelagics category in the Table 14, which comprise only 2% by weight of the total commercial exports amounted to about 74mt and worth around ST$1 million. Masimasi and wahoo were the major species exported which consisted of more than 60% of the total other pelagic exports. Overall, exported other pelagics were sold at an average price of ST$13/kg.

Table 14: *Other pelagic fishes commercially exported in 2000/20001 period.*

Common Name	Weight kg	% by wt	Total Value (SAT)	% by Value	Avg. SAT/kg
Swordfish	7642	10%	104468.6	10%	13.67
Moonfish	12570	17%	180415.3	18%	14.35
Dolphinfish	20149	27%	282412.4	28%	14.02
Wahoo	25685	35%	353308.1	35%	13.76
Others	7940	11%	94505.4	9%	11.90
TOTAL	73986	100%	1015110	100%	13.72

36 It was recorded that about 47.4mt of bottomfish was exported offshore and was valued at ST$585.5 thousands. Generally, items were sold on a mean cost/kg of ST$12.00. Humpback (*Lutjanus gibbus*), Silverjaw Jobfish (*Apherus rutilans*) and Emperors (*Lethrinus*) were the predominant fish types exported and acounted for about 70% of the total exported volume of bottomfishes throughout the period. Table 15 detailed the commmon bottom fish types exported commercially during the period.

Table 15: *Other pelagic fishes commercially exported in 2000/20001 period.*

Common name	Weight (mt)	% by wt	Total Value (SAT)	% by Value	Avg. $/kg
Humpback Snapper	18.5	39%	172,875.16	30%	9.3
Silverjaw Jobfish	8.3	18%	141,638.90	24%	17.1
Short tail Snapper	2.8	6%	59,116.40	10%	21.1
Emperor	5.6	12%	50,391.00	9%	9.0
Yellow Opakapaka	2.3	5%	34,800.41	6%	15.1
Variegated Emperor	2.4	5%	26,829.17	5%	11.2
Grey Jobfish	1.8	4%	25,873.21	4%	14.4
Unidentified Opakapaka	1.7	4%	24,578.12	4%	14.5
Other Bottomfish	4	8%	49,432.69	8%	12.4
	47.4	100%	585,535.06	100%	12.4

37 The majority of tuna were shipped frozen to the two canneries in Pago Pago which provide a convenient market for the albacore tuna in particulary and other pelagics, which is the major portion of the longline catch. About 87% of all tuna was exported to Am, Samoa and the rest were exported as fresh chilled to the United States. Most reef fish and bottom fish were exported to American Samoa, followed by Los Angeles and Hawaii. Frozen tuna was sold at an average price of about ST$7.5/kg and the value of exports was higher for fresh chilled fish in the USA markets. Breaking down details of commercial exports by destination and group is provided in Table 16.

Table 16*: Major destinations for commercial fisheries exports from Samoa during 2000/2001 period.*

	Tunas & pelagics				Bottomfishes & Reef fishes			
Destination	**Weight (mt)**	**% by wt**	**Value (SAT)**	**Avg. $/kg**	**Weight (mt)**	**% by wt**	**Value (SAT)**	**Avg $/kg**
Auckland	0.6	0.01%	8400.0	14.0				
Honolulu	25.1	0.62%	358077.8	14.3	3.9	8	66260.8	16.88
Los Angeles	515	12.70%	7519712.7	14.6	15.8	33	267202.13	16.85
Pago Pago	3514.3	86.67%	26332807.5	7.5	27.7	58	258212.12	9.31
Total	4055	100.00%	34218998.0	8.4	47.4	100	591675.04	12.45

Faaoso fisheries exports.

38 Faaoso mean fish and invertebrates exported fresh for family oversea mainly for home consumption purpose. The Fisheries Division had collected faaoso data from export certificates that issued when seafood were taken oversea for family consumption. It was estimated from these records that a total of 10.1 tons of seafood was exported during the year. About 75% of the total were reef-associated fish and invertebrates were shipped for family faaoso. Bottomfish, tuna and other pelagic species accounted for the remaining 25% of the total amount. Table 17 gives a breakdown of faaoso exports by fishery groups.

***Table 17**: The breakdown of faaoso exports by fishery group.*

CATEGORY	Wt (kg)	% by Wt
TUNA/PELAGICS	1465	14%
INVERTEBRATES ETC	359	4%
REEF FISH	7163	71%
BOTTOMFISH	1134	11%
TOTAL	10121	

39 *Acanthurus* species (Alogo, pone, ume, etc.) were the dominant reef fish type favorable for faaoso. Most faaoso exports went to American Samoa (72%) with a further 23% was given as faaoso to New Zealand. Table 18 gives a breakdown of major species composition for faaoso exports.

***Table 16:** Species composition of major reef associated fish fish sepecies exported for faaoso.*

Common Species Names	Wt kg	% by weight
Unidentified Reef Fish	3144.83	44%
Lined Surgeonfish	704.79	10%
Striped Surgeonfish	540.01	8%
Unidentified Goatfish	142.42	2%
Other Reef Fish	131.82	2%
Orange-spine Unicornfish	109.35	2%
Unidentified Soldierfish	91.21	1%
Vermiculate Rabbitfish	60.36	1%
Parrotfish	949.38	13%
Variegated Emperor	338.18	5%
Unidentified Emperor	329.9	5%
Bluespine Unicornfish	202.29	3%
Humpback Snapper	178.4	2%
Unidentified Unicornfish	138.05	2%
Grouper	101.7	1%
Total	7162.69	

Subsistence Fishery Survey

Demography, Village and household selection

40 Subsistence fishery is essentially important to the people of Samoa, especially to those living on the coastal fringe, contributing significantly to the health and nutrition of the people. Some comparative historical information was available from several earlier surveys conducted within the past 25 years estimated the subsistence fisheries as about 7,614 mt/yr in 1984 (Zann et. al., 1984) and 4,400 mt/yr in 1996 and 1997 (Ueta & Faasili, 1996 and Mulipola 1997). Subsistence fishery was periodically and irregularly studied by the Statistics Department, (1975); Zann et al, (1984); King (1989); Zann, (1995), Bell and Mulipola (1995), Mulipola (1997) and Zann (1997).

41 A nationwide household fisheries survey was undertaken in October and November, 2000, to collect subsistence fisheries data and to complete a profile on Samoan village fisheries. The survey covered 1092 households in 66 villages, 40 in Upolu and 26 in Savaii, i.e. a 20% coverage of villages and a 5% coverage of Samoa's households. The aim of the study was to determine the importance and the current status as well as updating the profile of the subsistence fishery in Samoa.

42 For the survey, villages were classified as either lagoon, mangrove, cliff, or inland villages, depending on local geography. Sampling was also stratified by village classification of a **lagoon**, adjacent to **mangroves**, on a **cliff**, or **inland**. Approximately 42% of all villages, containing 38% of all households, are considered lagoon, 22% of villages containing 29% of households were classified as mangrove, and 6% of villages containing 4.5% of households as cliff. The remaining 30% of villages containing 29% of households were classified as inland based on the understanding of the Fisheries Division. Table 17 shows the breakdown of all Samoan villages by strata.

Table 17. *Numbers of Samoan villages and households by strata.*

Location	Upolu		Savaii		Total	
	Villages	**Households**	**Villages**	**Households**	**Villages**	**Households**
Cliff	0	0	19	971	19	971
Inland	80	5371	18	749	98	6120
Lagoon	87	5502	49	2609	136	8111
Mangrove	57	5374	16	848	73	6222
Total	**224**	**16247**	**102**	**5177**	**326**	**21424**

43 Comparison analyses of data were made between the four strata, as well as for Savaii and Upolu. Additional comparisons were made between villages that had developed fisheries management plans under the Fisheries Division's Community Extension Programme, and those that had not.

44 Information from the Agricultural Census 1989 was used to calculate a fishing activity average index for each stratum for Upolu and Savaii. The index was then used to stratify villages for sampling, so that less effort was afforded strata where fishing was rare, and greater effort was placed in villages where fishing was common. The index was applied separately to Savaii and Upolu villages, to ensure a reasonable distribution of villages in both islands. The number of households was then selected for each island to allow similar levels of accuracy to be achieved for both islands, and thus make reasonable comparisons between the two islands possible. The final number of villages selected was 40 for Upolu, and 26 for Savaii, or 66 villages in total, representing 20% of all Samoan villages. This resulted in 1092 households in total, or 5% of total Samoan households.

45 Enumerators for the study were members of the Fisheries Division staff both from the Research and Extension sections. Enumerators were left to select individual households such that the required number of households in each village were sampled. If, for example, 20% of households in a village were to be sampled, enumerators would select approximately every fifth household. Enumerators were told that if nobody was home, they were to leave that house as a "no response", and endeavor to come back later and try and sample the same house. However, there were no cases of "no response" recorded during the survey.

Results

Fishing effort

46 Results were raised to account for all Samoan households, and showed that there are 11,700 fishers, living in 8,377 fishing households. Of the total fishers, about 82% are male and 18% ware female subsistence and artisanal fishers. The most common fishing method is diving and spearing, followed by gill netting, hook and line fishing, and gleaning. Most fishing takes place inside the lagoon. The 18% of female fishers mainly gleaning along the shoreline for shellfish or diving in the lagoon for seaweed, sea cucumbers, sea urchins and other invertebrates.

Estimated total landings

47 The total subsistence seafood catch for the year 2000 is estimated to be 7,169 tons, with a value of ST45 million. The average catch rate is 2 kg per person per hour fished. Villages with management plans have the highest catch rate of 2.8 kg per person per hour, compared with coastal villages with no management plans where the catch rate is 1.8 kg per person per hour. Fishers from cliff villages report the lowest catch rate at 1.6 kg per person per hour. For the purpose of monitoring the Fisheries Division community-based fisheries management programme, it is suggested that a catch rate of 1.8kg per person per hour is used as a monitoring baseline.

Seafood consumption

48 Average consumption of seafood per capita is 57 kg per annum, made up of 44 kg of fish, and 13 kg of invertebrates and seaweed. Inhabitants from lagoon villages report the highest per capita consumption at 68kg per annum, and inland villagers report the lowest at 45 kg per annum. Canned fish consumption per capita is 14 kg per annum, canned meat is 5.7kg per annum, and fresh and frozen meat is 92kg per annum.

49 Total seafood consumption for the country is 9,971 tons, with the seafood additional to that caught in the village being mainly pelagic species bycatch from the rapidly growing commercial longline fishery. The most commonly caught and eaten seafood surgeonfish (family *Acanthuridae*), except for inland villages, where tuna is more commonly eaten.

50 The total value of the seafood consumed in Samoan households is estimated to be over ST62 million per year, ST45 million of which is caught by village fishers. Together with fishery exports, the gross value of Samoa's marine resources is around ST100 million (approximately USD27 million) per year.

51 During the process of conducting the survey, training in survey techniques, including data enumeration and analysis was provided for Fisheries Division staff. A database for storage of the data was developed, and can be used for subsequent surveys. Valuable links were also established with the Samoa Statistics Department, and data to update several key figures calculated in this survey will now be collected during

their Agricultural Census annual update. A major dedicated household fisheries survey will then only need to be repeated every 3 to 5 years.

Length-Weight relationship

52 In an attempt to improve data collection from the market surveys, a length and weight survey was conducted to calculate estimated weights based on the shape of the fish and the invertebrate. could not be estimated at all. The length and weight of fish and invertebrates sold daily at the fish market were sampled in order to calculate variables in the power curve equation (W=qL^b) for estimating weights based on length.

53 In generating the length-weight relationship, it is assumed that the animal is growing isometrically, (increasing in all dimensions at the same rate) and doubles in length weight will increase in relation to the increase in volume; by 8 (2^3) times. Therefore there is a cubic relationship between weight (W) and length (L) represented by a power curve equation $W=qL^b$ where b is close to 3 in isometric growth and q is a constant that is determined empirically (King, 1995). The Fordwal equation, $W=qL^b$ was used to generate the length and weight relationships of fish and invertebrate types that are most commonly sold at the Fish Market.

54 A large number (818 pieces) of species were sampled from the Apia Fish Market but only a few species were identified correctly. The species that were identified correctly are shown the Table 18. The length – weight relationships survey is an on–going activity as there are numerous species sold at the market that need to be identified and measured correctly in order for the q and b values to be calculated and used weight estimation for data collection improvement

***Table 18**. Variables generated from fishes and invertebrates sampled at the Fish market.*

Species Fish	Common Names	q	b	r^2	n
Aprion virescens		0.000062	2.6938	0.8984	18
Acanthurus lineatus	Lined surgeonfish	0.000055	2.7475	0.5817	97
Acanthurus xanthopterus	Yellowfin surgeonfish	0.000009	3.2396	0.8929	76
Ctenochaetus striatus	surgeonfish	0.0000208	3.057	0.5383	135
Katsuwonus pelamis	skipjack	0.000024	2.9263	0.9149	158
Lutjanus gibbus	Paddletail snapper	7.35E-05	2.5882	0.7488	112
Naso lituratus	Orangespined unicornfish	0.000007520	3.3345	0.6372	26
Naso unicornis	Blue spined unicornfish	0.000200	2.3497	0.8183	196
Invertebrates					
Octopus sp.	Octopus	0.0014	2.646	0.8108	99
Panulirus penicillatus	Lobster	0.000203	2.4941	0.8391	211
Parribacus caledoninus	Slipper lobster	0.001407557	2.4112	0.5914	24
Scylla serrata	Mudcrab	0.000177	3.0211	0.8715	104

Resources assessment and fish reserves

Fisheries Reserves

55 It is noted in Zann (1999) that the status of coral reefs around Samoa ranges from highly degraded to very good. However, in the last 10 – 20 years it has been eminent that numerous edible fisheries resources have been heavily reduced due to overfishing, increasing population, natural disasters such as cyclones (Ofa in 1990 and Val in 1991), increased runoff from land and destructive fishing methods.

56 Since 1996 with the assistance of the AusAID Samoa Fisheries Project 62 small community owned and managed fish reserves have been established and monitored in an attempt to re-establish fish and marine invertebrate stock and maintain biodiversity and species abundance. Although the fish reserves are small, it is believed that the network of small reserves facilitates the recruitment of fish and other marine species in areas outside the protected areas. The reserve areas range from 20,000 - 150,000m^2 in size.

57 Since the reserves are community-owned, the village decides how to manage their reserve with technical support from the Fisheries Division. In some cases, villages have declared a total ban of fishing activities within the reserve area while some villages have imposed close seasons in particularly when there are large village gatherings. When the village decides to establish a fish reserve the proposed area is assessed to estimate the abundance and diversity of marine species and the final decision is up to Village Fono taking in account advices provided by FD.

58 Upon the establishment of a fish reserve an initial ecological assessment of the reserve area is conducted to document and estimate the abundance and diversity of flora and fauna. After approximately 12 months a re-survey is conducted to record any changes that have taken place since the initial survey. During the 2000/01 period assessments were carried out in 12 villages on both Savaii and Upolu as indicated by Table 19.

***Table 19**: Reserves surveyed in the 2000/01*

Site name	Assessment	Est reserve area
Sataoa	I	40000
Vaisala	I	120000
Fusi, Safata	I	28000
Siufaga	I	60000
Faleula	R1	30000
Saoluafata	R3	62000
Matafaa	I	45000
Fatuvalu	R1	30000
Fagaee	R1	30000
Papa-I-Palauli	R1	80000
Vaitoomuli	R1	80000
Lalovi	R1	80000

I = initial, R1 = re-survey 1, R3 = re-survey 3

59 The survey methods used by the Fisheries Division are Fish and Invertebrate Counts for counting mobile fish and invertebrates and the Line Intercept Transect (LIT) is used to assess sessile benthic communities which include live coral, dead coral, algae, seagrasses, sand, and rubble. The methods used by the Fisheries Division have been adapted from methods outlined in ReefCheck and the AIMS Survey Manual for

Tropical Marine Resources. A database has also been developed for data collection from fish reserve surveys.

60 Reassessed fish reserves were generally good with coral coverage being estimated as 8-10% recovered over the past three years. Likewise, several food and aquarium fishes have been increased as well.

Training

61 The Fisheries Division had further received technical for it's database system from the OFP-SPC technical team during the year. Colin Milar, Computer Specialist had assisted the Research Section staff responsible for the data collection to modified and improved the existing database system. Additionally, staff have also received training on system development and data management as well.

62 Practical exercises and training were received by staff of the Research Section from a Coral Reef Specialist on methods of monitoring coral reef habitats and biodiversity enabling them to conduct the monitoring of the established community-based MPAs or fish reserves.

APPENDIX. 3: Sub Output – 15.4 Development and Exploratory fishing Services

63 This program comes under the Output AG 15.4 and aimed at conducting fishing trials. Two vessels had been involved in performing the field activities during this financial year.

Fisheries Division fishing vessels and exploratory fishing

Ulimasao Fishing Trials

64 The newly designed super alia Ulimasao launched in April 2000 has completed 23 trial trips. The results of the long line fishing and sea trials were very encouraging. The vessel is feasible for the fishing operation in Samoa and has proven itself over the last 23 trips that were conducted. The present design is adequate to conduct full-scale long line fishing operation and is much better than the original small design. The larger size and the stability of the vessel, the insulated fish hold below deck, the added safety and efficiency of the twin diesel engines, the cabin for accommodation and the latest navigational equipment, all make this good small-scale tuna long liner that appears to work well under the Samoa fishing conditions. Table 20 provides the summary for the 24 fishing trips and the catch and Appendices 8 and 9 summarises the trips in full details.

65 The vessel faces problems with its steering wheel since March this year. Difficulties in obtaining materials and the unavailability of the local machinery delayed repair works. At the time of writing this report the engineer was attending the problem and the boat is now back into the water and hopefully it will begin its operation in early July 2001.

Workshops/Training

66 Besides the fishing trials, training for the crews on fish handling and storage as well as navigation and seamanship were also conducted on board. The crews were also involved in the Tuna Grading, Tuna Loining and Filleting workshops that were conducted together with the local fishermen and fish exporters during the year.

Fish Aggregating Devices (FADs)

67 No funding was allocated for this programme during this financial year.

Future Activities

68 No funding was allocated for this programme during this financial year.

- Conduct trial fishing for the sashimi markets
- Continue to provide training for the local fishermen on fishing gear and methods
- Continue to conduct training on fish handling, storage on board and quality control
- Continue to conduct long line fishing trials with collaboration of ARMS
- Monitoring of the three existing FAD units
- Conduct trial fishing around the vicinity of the devices to test the productivity

Table 20: *Details of the fishing trips conducted by fishing vessel Ulimasao during 2000/2001 period*

Trip #	Date	# of sets	Average # hooks per set	Total Weight of Catch (kg)	Total Value (SAT)
1	16.05.00	2	620	2,313.90	7,832.96
2	5.06.00	3	710	1,040.78	4,525.98
3	16.06.00	3	720	926.96	4,382.10
4	24.06.00	4	730	1,626.36	7,146.55
5	03.07.00	4	730	1,481.86	7,377.54
6	10.07.00	3	735	1,580.11	7,963.32
7	18.07.00	1	730	93.91	285.60
8	04.08.00	3	1100	367.34	2,054.46
9	10.08.00	2	1150	1,783.74	8,032.68
10	15.08.00	3	907	1,658.11	7,269.84
11	21.08.00	2	1200	402.07	1,939.00
12	13.09.00	3	1040	739.61	7,209.65
13	19.09.00	2	1065	284.96	3,049.68
14	27.09.00	3	866	648.52	6,679.50
15	23.10.00	3	1046	455.04	4,905.44
16	6.11.00	3	840	867.13	9,313.84
17	14.11.00	3	1026	920.96	9,166.62
18	27.11.00	3	926	561.57	5,854.05
19	5.12.00	3	633	781.04	7,672.02
20	11.12.00	2	775	153.65	1,386.48
21	16-01-01	3	980	592.61	6,243.44
22	24-01-01	2	1020	718.43	7,851.12
23	05-02-01	3	870	530.91	5,072.84
24	13-02-01	1	990	61.74	670.24
			TOTAL	***20,591.31***	***133,884.95***

APPENDIX. 4: OUTPUT 16 - AQUACULTURE SERVICES

69 The outcomes that report in this section are the achieved targets as appropriated under the 2000-2001 budget for the Output 16.0 of the MAFFM. Aquaculture activities undertaken throughout the fiscal year including the production of tilapia fish *Oreochromis niloticus* and giant clams (*Tridacnids spp*) at the FD Tilapia and Toloa Giant Clam hatcheries. In addition, fry and seedlings produced were distributed to selected sites for both initial stocking and restocking for resources enhancement purpose. Moreover, several bivalves of species tugane (*Gafrarium tumidum*), pae (*Anadara antiquata*) and pipi (*Asaphis violascens*) were selected for translocation trials for stock enhancement objective.

Freshwater Tilapia (*Oreochromis niloticus*)

Stocking/Enhancement of Natural Lakes, Ponds, Pools in Villages

70 The Fisheries Division, in an effort to lessen fishing pressure on the over-exploited nearshore fishery resources, initiated aquaculture projects, including stocking of natural lakes/ponds. The stocking of tilapia in natural lakes/ponds have created important fisheries in certain village communities in Samoa. Ensuring the realisation of this attempt, a 3-year AusAID-assisted Fisheries Extension and Training Project (FETP) was launched. Its immediate/medium term goal was to prevent a further decline in the near-shore fishery resources with a community-focussed extension plan and the development of alternative sources of seafood to those resulting from the heavy exploitation of near-shore reefs and lagoons.

Table 21: *Nile Tilapia Stocking into Natural Lakes/Ponds/Pools in Samoa during year 2000 and first half 0f 2001.*

Island	Village	Date	Tilapia Wt (g)	No. stocked	Notes
Upolu	Vaovai, Falealili	26 Jan 00	brood	20	Stocked small pool used to be drinking water source for village. Fish later escaped into lake
	Fausaga, Safata	5 Apr 00		17	Stocked small pool which used to be for bathing & drinking for village
		15 Dec 00		50	Additional stocks for pool
	Tafitoala	16 May 00		150	Stocked fence but fish later released to lake
		21 June 00		150	Additional stock
Savaii	Mosula	23 May 00		300	Stocked pool which used to be drinking pool for Church. Operated by Church (Mormon)
		23 May 01		305	Additional stock for Church pool
	Auala	23 May 01		210	Additional stock for village lake

71 During the time of the FETP, Nile tilapia fry were introduced to natural freshwater/brackish-water lakes in 8 villages (Table 21) as part of Component 5, *Alternative Seafood Development*, of the project. In addition, three village demonstration farms were constructed and stocked with fry. [Two of these farms were funded by the FAO South Pacific Aquaculture Development Programme (SPADP (II))]. The Samoa Fisheries Project (second phase of the FETP), started in February 1999. Component 4 of the project, *Fisheries Related Development*, includes facilitation of development in aquaculture through upgrading facilities that increase the production of tilapia. A total of more than 1,000 broodstocks of tilapia niloticus were provided by the FD to stocked natural lakes, ponds and pools of communities requested during the 2000/2001 period.

Demonstration fish farms

72 During the fiscal year period 2000/2001 only the farm at Chanel College was operational. Due to slow fish growth rates obtained at the farm during 1999, a monosex culture trial was initiated in September 1999 and continued onto the 2000. Unfortunately, the trial was not completed properly due to several problems that arose concerning management, operation and maintenance of the farm. Table 22 records data that were collected during the culture trial.

73 A total of 2,160 Nile tilapia fry were stocked at a high density into one of the 2 ponds (Pond 2). After 2 months of culture, these were harvested, sexed and males stocked into the other pond (Pond 1). Female tilapia were taken to the hatchery to serve as broodstock. The males stocked into Pond 1 were fed daily at 10% of fish biomass. After 2 months of stocking males only, it became evident that selection of males was not 100 per cent effective as fry started to appear in the pond.

74 The number of fry in the pond increased in each consecutive month. While harvesting was envisaged after 6 months of culture, this was delayed when it became apparent that the fish growth was slow. This slow growth was attributed to overcrowding from fry as well as the absence of any pond management/feeding by the farm owner for several months. When a date was decided upon for the harvest, Fisheries was informed that farm owner had conducted several harvests from the pond for home consumption. No data was available of fish harvested except 11 lbs purchased by Fisheries in March 2001 for a Nile tilapia consumption promotion workshop on Savaii. The College management took over full responsibility of the operation of the farm by the end of the year 2000.

Table 22: *Monosex culture trial of Nile Tilapia at Chanel College Farm*

	1999				2000		
	← MIXED SEX Pond 2 →			← ← ALL MALE Pond 1 →			
	29 Sep	**28 Oct**	**17 Nov**	**7 Dec**	**29 Feb**	**24 Mar**	**1 Aug**
No. of fingerlings/fish stocked	2,160	2,125		1,101			
No. fish sampled		24	41	45	28	27	27
Total wt of sample (kg)		0.67	2.15	3.35		3.95	3.95
Fish average weight (g)	14	27.9	52.4	74.4	130.0	151.9	146.3
Fish average length (cm)	10.5	11.8		13.5	16.3	16.0	17.1
Est. total fish weight (kg)	30.2	59.3	111.4	81.9	139.6	167.2	161.1
No. dead fish found					0	0	0
Est. total # of fish alive	2,125	2,125	2,125		1,100	1,100	1,100
Period duration (month)		1.0	0.7		2.8	0.8	4.3
Period Av. Fish weight increment (g)		1.3	24.5		52.3	25.1	-5.6
Period growth per month (weight: g/m)					18.9	31.8	-1.3
Cumulative weight increment (g)		1.3	38.4		52.3	77.4	71.9

Fence (Pen) Culture

75 During the year 2000, only one fence was constructed by the Fisheries for the village of Tafitoala which is under the Community-based Programme. However, a private family requested technical assistance from the Fisheries in setting up the Nile Tilapia fence. Both these fences were stocked with Nile tilapia from the Fisheries hatchery. Table 23 summarises the number of locations where the Section had assisted in setting up fences and stocked with tilapia since the fence method of farming had started.

76 The fence constructed at Tafitoala was later removed due to the decrease of the water level, and the fish released into the adjacent small natural lake. The fish are now growing in the small lake. The fence culture by the family at Tufuiopa is progressing well. All of the fish stocked have reached marketable size by June 2001. The stocked fish have also reproduced successfully in the fence and the family has added another fence to separate different sizes of Nile tilpaia.

Table 23: *Stockings of Nile Tilapia Fence (Pen) Culture Trials.*

Island	Village	Date Stocked	Number Stocked	Notes	Comments
Upolu	Mulivai Safata	21 Oct 99	100	Village	Initial stocking
	Salani Falealili	21 Oct 99	200	Church group	Initial stocking
	Vaovai Falealili	23 Dec 99	200	Village	Initial stocking
		26 Jan 00	200		Re-stocking
	Tafitoala Safata	16 May 00	150	Village	
		21 Jun 00	150		Re-stocking
	Tufuiopa	??	27	Private	Initial stocking
		22 Aug 00	200		Re-stocking
Savaii	Satoalepai	5 Oct 99	200	Village	Initial stocking

Cage Culture

77 Experimental cage culturing of Nile tilapia was initiated in 1995 and since then, five locations have used cages to raised tilapia (previously reported). During the period 2000 and the first half of 2001, cage culturing of Nile tilapia was initiated in five other villages. Four of these villages are under the Community-based Programme while the fifth one is for a Church group. Stocking summaries pertaining to these cages are recorded in Table 24.

Table 24: *Cage Culture of Nile Tilapia during 2000 and the first half of 2001.*

Village	Cage size	Date of Stocking	# N. tilapia stocked	Ave. Wt N.T. stocked (g)	Comments
Upolu					
Fagalii	2.3m x 1.8m x 0.88m deep	31 May 00	100	52.4	Initial Stocking Cage 1
	2.3m x 1.8m x 0.88m deep	9 June 00	129	30.0	Initial Stocking Cage 2
		??	30		Restocking Cage 1
Malaela	3mx3mx1m deep	19 Aug., 00	160	12.5	Initial Stocking
Salani	3mx3mx1m deep	22 Aug., 00	120	17.5	Initial Stocking, Church group
		6 Mar 01	60		Restocking
		8 May 01	70		Restocking
Savaii					
Sapapalii	3mx2mx1m deep	23 Aug., 00	150	82.2	Initial Stocking
Mosula	3mx4mx1m deep	29 Sept 00	60	17.5	Initial Stocking

78 Nile tilapia growth in cages deployed at Fagalii was very slow. As a result, the original stock in one of the cages was discarded in 2001 and re-stocked. Slow growth can be attributed to poor maintenance and low level of water within the cage. Different from other forms of farming Nile tilapia, cage culture relies heavily on artificial feeding. Thus poor growth can be attributed to poor feeding.

79 The cage deployed at Malaela was later dismantled and material brought back because no maintenance was provided by the village. The Nile tilapia stocked in the cage at Salani were growing well. Unfortunately, a tree fell on the cage pushing the whole cage under-water enabling the fish to escape though the top of the cage. The cage was later re-stocked but most of the fish escaped via holes not known before re-stocking. The repairs were made and the cage re-stocked in May 2001. Good growth has been observed so far.

80 Length and weight data collected for cages deployed at Sapapalii and Mosula are recorded in Table 25. Nile tilapia in the cage at Mosula shows faster growth. This could be attributed to better maintenance and lower stocking density for the cage at Mosula.

Table 25: *Length and weight data for cage culture trials at Mosula and Sapapalii.*

			Average Weights	
Village	**Cage Size**	**Stocking date**	**23 Aug., 00**	**27 June 01**
Sapapalii	3mx2mx1m deep	23 Aug., 00	82.2	107.3
			29 Sep., 00	**4 May 01**
Mosula	3mx4mx1m deep	29 Sep., 00	17.5	175.0

Hatchery Facility

81 Breeding Nile tilapia at the Fisheries Division hatchery started in 1995 using the remaining *O. niloticus* fry imported from Fiji in 1994 after stocking the Salani ponds as the original broodstock. The current hatchery sited at the Fisheries Division compound comprises of 6 concrete ponds (raceways); fresh-water system connected to all ponds;and air supply system connected to all ponds.

82 Production of Nile tilapia fry at the hatchery currently utilizes procedures recently developed under the AusAID-assisted Project. Details of these procedures can be found in the Manual, *Nile Tilapia Farming in Samoa: Production, Distribution and Monitoring*. The breeding procedure involves proper selection of broodstock (male & female) that weight more than 200 g each and stocking them into a breeding tank at the rate of 3 fish per m^2 and a ratio of 1 male to 3 females.

83 After three weeks, the broodstock are removed and stocked into conditioning ponds before the next breeding cycle. [Female and male broodstock are kept in separate tanks during the conditioning period]. The fry are harvested and stocked into a primary pond at a rate of 500-750 fry per m^2 of surface water and cultured there for 3 weeks after which they are harvested and moved to the secondary ponds. The fry are stocked into the secondary tanks at 100 fry per m^2 and cultured there until they reach the size of 4-10 g (5-7.5 cm) which is a good size for distribution to grow-out facilities.

84 Nile tilapia fry supplied from the hatchery for distribution to villages and individuals during 2000 and the first half of 2001 is given in Table 26. Nile tilapia stocks at the hatchery in June 2001 include 5,704 fry of various sizes and 92 broodstock (25 females, 67 males). Most of the fry are ready for distribution. These will be used for the continuation of the stocking/restocking programme.

Table 26: *Nile tilapia fry supplied from the Fisheries hatchery for stocking during year 2000 and first part of 2001.*

Year	Date	Number	Site
2000	26 Jan	200 + 20 brood	To restock fence at Vaovai Falealili & Stock village pool at Vaovai Falealili
	5 Apr	17	To stock vilage pool at Fausaga Safata
	12 Apr	43	To stock private pond at Laulii
	16 May	150	To stock fence at Tafitoala Safata
	23 May	300	To stock Church pool at Mosula Savaii
	31 May	100	To stock cage at Fagalii
	9 Jun	129	To stock second cage at Fagalii
	21 Jun	150	Additional stocks for Tafitoala Safata
	19 Aug	160	To stock cage at Malaela
	19 Aug	80	To stock private pond at Luatuanuu
	22 Aug	120	To stock cage at Salani Falealili
	??	27	To stock private fence at Tufuiopa
	22 Aug	200	Additional stock for private fence at Tufuiopa
	23 Aug	150	To stock cage at Sapapalii
	4 Sep	50	To stock another private pond at Laulii
	end Sep	50	To stock cage at Mosula Savaii
	15 Dec	50	Additional stock for Fausaga pool
2001	??	30	To restock cage at Fagalii
	8 Mar	60	To restock cage at Salani Falealili
	23 May	305	Additional stock for Mosula Church pool
	23 May	210	Additional stock for Auala lake
TOTAL		**2,601**	

Giant clam (Tridacnid species)

Hatchery facility

85 Clams of the family Tridacnidae are the largest clams known in the world. Of the eight species occurred in the tropic, only three species occurred naturally in Samoa, *Tridacna maxima*, *Tridacna squamosa* and *Hippopus hippopus.* The latter was considered extinct in a survey carried out by Zann (1991). In Samoa, clams are an important food item and can fetch good prices at the Apia Fish Market, depending on the size and regardless of species.

86 Hatchery culture of giant clams is a relatively new activity in Samoa. The FD giant clam hatchery located at Toloa was set up with the objectives of stock enhancement, due to the decline of this valuable resource as a consequence of over harvesting. Re-seeding the marine environment is integrated into the Fisheries Extension and Training Programme (FETP) whereby villages are encourage to directly engage in the management of their marine resources and environment. It is expected that via the community-based management approach, stock enhancement would be sustainable. Furthermore, re-seeding of reefs, as like other aquauculture activities, offers an alternative to alleviating fishing pressure off the reefs and a means of food production in particular the protein component of the human diet, owing to the successful reproduction and settling of clam seed in the natural environment.

87 The Giant Clam Hatchery was established in October 2000. The facility houses a dry lab, larval room, pump house plus raceway ponds. The larval room accommodates four fibreglass larval rearing tanks with fluid capacity of 700litres for a single tank. Tanks were usually filled up to 600 litres to accommodate 12 million eggs per tank at a stocking rate of 20eggs/ml. There are ten raceways with the following dimensions 30ft x 8ft x 2ft with a fluid capacity of 13,000litres and stocking rate of 1 larva/5ml. The settling and rearing phase of clams occurs in settling tanks (3+) where a total of 2.6 million larvae can be held at one time after settling. Juvenile rearing occurs in nursery raceways (7+) with a floor area of 22m² and a clam density of 1,000/m². In total, a single nursery raceway can hold 22,000 juvenile clams.

88 More than 200 broodstock of *T. gigas, T. derasa, H. hippopus,* and *T. squamosa* are kept at the Palolo Deep National Marine Reserve and were used for the successful breeding programme at the newly constructed hatchery. . Prior to spawning, broodstock is transported to the hatchery. Transport distance starts the thermal stress/induction period and intensifies stress and therefore facilitates propagation. Additional 14 broodstock of T.squamosa were obtained locally through the dividing search expedition conducted by the Research Section of the Division.

Propagation / spawning

89 Spawning methods used were the thermal induction and serotonin injection. Thermal induction is the most common approach preferred, which involve macerated gonad to induce spawning when the clams are heated stress. The latter is a pheromone, which induces other clams to spawn so that when other clams release their gametes other clams are likely to release their gametes resulting in epidemic spawning (Heslinga *et al*, 1990). The approach used for larval culture at FGCH was mostly intensive, Intensive larval culture was the most preferred method, though costly, but yields seemed to be higher.

90 The first spawning run occurred in November 2000 with *Tridacna derasa* produced about 11,000 seedlings. The latter species and *T. gigas* both non-endemics to Samoa were introduced in the early 1990's for the purposes of re-seeding. Several other spawning runs have been successful as well and resulted to patch of *T. maxima* are now visible. The juvenile clams of *T.derasa* have reached an average size of 3-5 cm and now ready for distribution to village lagoon nurseries by August 2001.

Village Giant Clam Lagoon Nurseries

91 The provision of seedlings for village lagoon nurseries to replenish depleted faisua resources is one of the many options attempted by the FD to promote stock enhancement. To date about 43,286 giant clams have been introduced into 61 village lagoons/reefs on the islands of Upolu, Savai'i, and Manono. However, only about 30% still remained in 19 village lagoon nurseries. Waves, predation, poaching and poor maintenance attributed to the lost and the decline in numbers of clams over the years.

92 Villages currently involved in the Fisheries Village Extension Programme, which have established "no take" zones also known as fish reserves, culture young juvenile clams supplied by the Fisheries Division. It was given with the intention of re-seeding the reefs and the communities are aware of this predicament and continue to work together with the Fisheries Division in maintenance of the giant clam lagoon nursery. Staff from Fisheries Division visits these lagoon nurseries on a monthly basis to obtain counts of clams and growth measurements from a sample using vernier calipers. Upon these visits, technical advices were regularly provided for members of VFMAC on the proper maintenance of clams to ensure low mortality and quick growth.

93 During the year, no clam seedlings were provided as effort and resources were focussed on the construction of the hatchery and seedling production. However, the last stock taking revealed that ??% of clams have cultured in lagoon nurseries have reached length of sexual maturity and they are likely to be spawned. Growth of the clams in the nurseries has mostly reached maturity especially *T. derasa* where the male phase reaches maturity at 3 years and the female phase at 5years (Heslinga *et al*, 1990). It has a growth rate calculated at 5.4mm/month. Heslinga *et al* (1990) calculated growth for Palauan *T. derasa* at 5-6cm/year in the first 5 years. The following Table 27 outlined the numbers of stocks introduced and currently remaining in the 19 village lagoon giant clam nurseries.

***Table 27**: Faisua stocks introduced and currently remaining in 19 village lagoon nurseries.*

Village	Species	No. Introduced	Date Introduced	No. Remaining	Average Length (cm)
Upolu					
Fagalii	T. derasa	400	25-Jul-99	291, (12/7/01)	157.9
Fasitoo-tai	T. derasa	300	30-Jun-99	116, (18/7/01)	162.3
Fuailolo'o	T. derasa	400	30-Jun-99	254, (26/7/01)	159.5
Lalovi	T. derasa	427	30-Jun-99	97, (26/7/01)	154.5
Lepuiai-tai	T. derasa	200	1-Jul-99	143, (5/7/01)	191.1
Safaatoa	T. derasa	500	4-Feb-98	195, (17/7/01)	244.5
Saleilua	T. derasa	400	8-Jul-99	10, (14/8/01)	177.2
Saluafata	T. derasa T. gigas	300 50	1-Jul-99 22-Jun-99	231, (3/7/01) 24, (3/7/01)	165.9 267.5
Samatau	T. derasa	400	30-Jun-99	357, (31/7/01)	179.6
Solosolo	T. derasa	250	23-Jun-99	13, (5/7/01)	203.6
Tauao'o	T.derasa	2150	28/06/96	30, (18/7/01)	267.8
Vailoa	T. derasa T. squamosa	250 74	2-Jul-99 22-Jun-98	89, (14/08/01) 49, (14/8/01)	184.8
Savaii					
Auala	T. derasa	500	26-Aug-97	62, (8/5/01)	191.4
Asau	T. derasa	500	19-Aug-97	16, (8/5/01)	208.4
Fagaee	T. derasa T. gigas	250 50	21-Feb-99 21-Feb-99	42, (22/5/01) 7, (22/5/01)	164.1 217.7
Fagamalo	T. derasa	500	22-Aug-97	73, (26/7/01)	254.5
Lelepa	T. derasa	400	2-Jul-99	145, (2/5/01)	115.0
Manase	T. derasa	400	20-Jul-99	186, (26/7/01)	241.7
Satoalepai	T. derasa	1500	21-Jul-97	90, (26/7/01)	300.9

94 Since July 2000, there have been four site assessments for giant clam culture in lagoon nurseries. These villages were located in Savaii, namely, Fatuvalu, Foailalo, Papa-Sataua and Vaisala. Of these villages, Vaisala and Fatuvalu conformed to the parameters for site selection. The first shipment of *T. derasa* juveniles from the hatchery will be delivered to these villages in August 2001 and the amount has yet to be decided. Villages in Upolu have yet to be assessed.

95 Monitoring of the lagoon nurseries continues as well as data collection to obtain growth rates for other species. The aim of the re-stocking programme will hopefully be achieved in these lagoon nurseries as they reach sexual maturity stages. Introduced species have a faster growth rate than the local species and are ideal in the re-stocking the reef.

Bivalve Translocation

96 Translocation of bivalves was initiated as a possible remedial plan to a concern of shellfish resources depletion in some region of Samoa. The research determined the possibility of re-stocking depleted resources in areas, which previously had these bivalves, occurred abundantly. The pae (*Anadara* sp.) was translocated in Fagalii, pipi (*Asaphis* sp.) for Poutasi and both Auala and Asau were stocked with tugane (*Gafrarium tumidum*). Table 28 summarises the bivalves sources and areas where the shellfishes were translocated..

Table 28: *The source villages for the bivalves are given in the table below.*

Source:	Species:	Village translocated to:
Fusi	Pae	Fagalii
Vaiusu	Tugane	Auala
Vaiusu	Tugane	Asau
Faala, Asau	Pipi	Poutasi

97 The translocation trial was started in February 2000 and expected to be an ongoing activity for another 12 months. The gonad condition will be investigated to determine the progress of the growth and spawning time. It is anticipated that these bivalves will reproduce and facilitate stock enhancement of nearby areas and to become established fisheries over time.

98 Bivalves involved in the translocation trials are common in soft substrates. An analysis of the environment (sediments, temperature, salinity) where the bivalves were to be translocated was carried out in all four villages. Sediment samples for both the source and target villages were analysed. Samples were baked then sieved through different sieve sizes. Sediment samples from source and target villages were compared for substrate likeness. Physical parameters such as temperature and salinity for source and target villages were both measured. Location of the sites was finalized after results from sediment samples were analysed.

99 Re-stocking was carried out over a period of several months depending on the availability of bivalves from the source villages and the target amount needed for the trials. Shells were filed and measured before they were planted into the substrate for all four villages. The area where the shells were propagated was marked by stick poles and looked after by the village as part of their aquaculture activities.

100Translocation experiment is resulted to a total of more than 3,000 tugane seedlings were transferred and planted in sites at Auala and Asau villages. Similarly, about 150 pae shellfish was planted in two sites at Fagalii and 750 were translocated at Poutasi. Table 29 detailing the total numbers of shellfish species being translocated at each respective areas by numbers, dates and mean sizes measured prior to planting.

Table 29*: Translocated bivalves by species, area and dates.*

Stocked area	Species:	Stockin date	Numbers stocked	Avg length cm
Auala (S1)	*Gafrarium tumidum*	5/4/00	1082	37.48
Auala (S2)	*Gafrarium tumidum*	27/9/00	1009	39.47
Asau	*Gafrarium tumidum*	06/4/01	1022	37.48
Fagalii (S1)	*Anadara antiquata*	14/3/00	100	68.6
Fagalii (S2)	*Anadara antiquata*	14/3/00	48	70.1
Poutasi	*Asaphis violascens*	27/3/00	750	44.18

101Tugane stocked at Asau was found to be extensively suffered from predation as indicated by only shell fragments were found. Likewise, the same results showed by tugane at the two sites at Auala where only shell fragments were found aslo. . Predation on tugane was suspected to be from mangrove crabs inhabiting the sediment. However, it was decided to re-stock the site at Auala and predation was considered in the second re-stocking. Asau was not re-stocked as the sediment was not appropriate but was considered for trials. A cage/fence was placed inside the fence to provide protection and comparison. A count of 100 tugane filed for tagging and measured were planted inside the trial site. Inspite of the heavy predation on tugane at both villages, the monitoring results have shown that survival and growth were generally good and will continued to be monitored.

102At Fagalii, two sites were chosen for planting pae both within the fish reserve. One was close to shore and one further away. This was done to determine which site would show better growth and survival. This was similarly done at Auala, where a site inside the village pool and a site outside the pool were chosen for monitoring.

103Pae at the site furthest from the shore were moved to the site near the shore. Those at the latter site showed better growth even though the other site still showed good growth. Predation was not a significant factor in the mortality of pae but more from shock in a new environment and possibly handling. The village reported that this species was found in their shores but had declined over the years possibly from over-harvesting. These species continued to be monitored and showed good growth.

104The pipi at Poutasi were planted at a site adjacent to the beach, within the fish reserve. The site was checked for survivors but only a few were recovered. Shells were found in the sediment although the reason for mortality was not known but could be most likely from predation or shock from being in a new environment.

105Also, another factor noticed by the Fisheries staff working in this area was that the village was not very keen in supporting this activity. The support of the village in carrying out this activity is important for the sustenance of this programme and this is beneficial for the marine environment of the area and consequently the people.

106Initial trial monitoring was carried out on a monthly basis. Following heavy disturbance from predation in some areas, and occasional disturbance from the monitoring itself, it was decided to change the frequency of monitoring to a bi-monthly basis. This would allow the animals to grow with minimal disturbance.

107The translocation trial has been in practice for less than a year but the growth of the animals has been good overall. Monitoring will be continued to the end of the trial period. At the end of the period an assessment of the gonad condition will be determined to assess whether these bivalves have grown to reproductive stage in their environment. It will also indicate the future of any translocation trials within the country.

Mudcrab farming trial

108Mudcrab farming has been conducted in many Asian countries with three species of crabs are of commercial importance including *Scylla serrata*, which is found locally and currently utilized in the farming trials. Mudcrabs are estuarine animals, when fully roed females migrate to the open sea to spawn after copulation in estuaries. The mudcrab farming trial was to determine the biological and economic feasibility of farming crabs on a subsistence level as a low-technology/low-cost aquaculture activity for local communities. Farming mudcrab has high potential for commercial aquaculture development in Samoa

as it is considered a high-value food item/commodity with an average cost/kg of SAT$25 at the Apia Fish Market.

109 The feasibility of the mudcrab farming trials will be assessed after the culture period, which is approximately 6 months. Partial harvesting will take place after this period and crabs that are of marketable size of 200g and greater will be selected. An economic assessment will then be carried out.

110 Site selection was carried out initially to determine potential sites for farming. Two sites, Saanapu and Sataoa were considered and selected as having ideal environment and extensive mangrove forest. However, conflict within the village halted the progress of the trials in Sataoa and the trial was carried out only at Saanapu. Since the trial site is located within the village, the monitoring and security of the farm are the responsibility of the Saanapu Fisheries Management Committee.

111 All crabs stocked into the enclosure were measured for their carapace length, weight and its sex determined. Water quality parameters (temperature, salinity, oxygen) were measured twice a week and the feed (tilapia fish) supplied by the Fisheries Division also twice a week. Growth has been monitored monthly by taking samples (approximately 50 crabs) using baited traps, weighed, measured and sexed then replaced in the cage. This will also determine the feeding rate on a monthly basis. Total mortality estimates will not be available until the end of the trial

112 A total of 107 mudcrabs of average length and weight of 106.35 mm and 197.73 g respectively were stocked in a pen for a test period of 6 months to assess their growth rate, survival, feed used, production cost and generated return/revenues. Nevertheless, outputs (growth rate, survival, costs of production and return/revenue) could not be generated, as the samples from the trapping surveys were insufficient for analysis due to few crabs inside the pen. It is hoped that with the resumption of the trials, better security of the site and maintenance of the pen will lead to better results and outputs can then be generated.

113 The security of the trial site was a major hindrance to the progress of the trial as poachers damaged the pen and stole the crabs. The trail was halted for several months until the village has agreed to provide crabs for restocking the pen and tightening security.

114 Outputs (growth rate, survival, cost of production and return/revenue) could not be generated, as the samples from the trapping surveys were insufficient for analysis due to few crabs inside the pen. It is hoped that with the resumption of the trials, better security of the site and maintenance of the pen will lead to better results and outputs can then be generated.

APPENDIX. 5: Output 17.0: Fisheries Extension Advisory Services

Village/Community Based Fisheries Management

Background

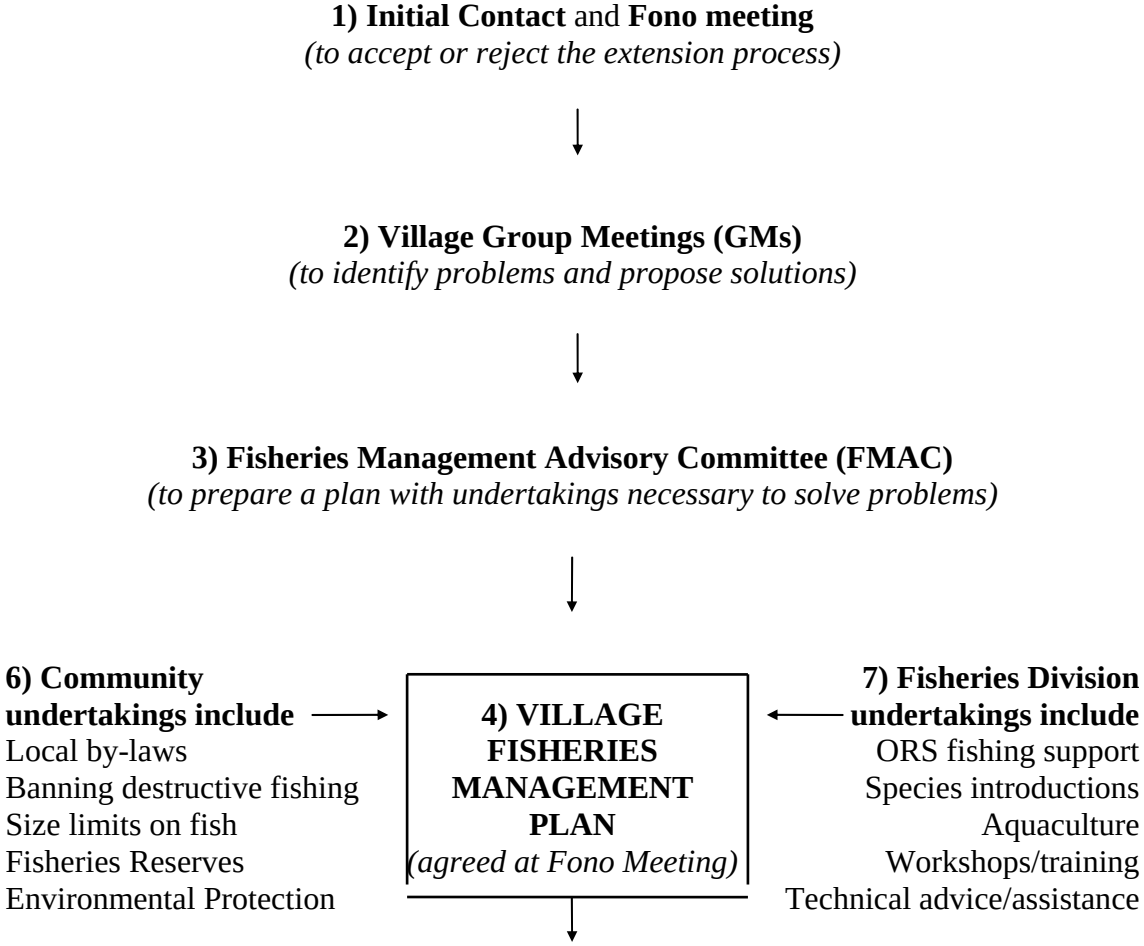
115 With funds from the Government of Australia through AusAID, the Fisheries Division has set up and improved its advisory services with the establishment of the Samoa Fisheries Extension and Training Project. The project duration was six years broken down into two phases of three years each. The Fisheries Extension Program was one of the two main components of the project in its first phase, which ended in 1998. The overall purpose of the Fisheries Extension program in the first phase was to establish community fishing practices consistent with maximum productivity and sustainability of marine resources.

116 The ultimate goal of the Extension Program is to target fishing communities, being resource users to take charge for responsible exploitation and management of their subsistence and artisanal fisheries. The involvement of fishing communities in the management of these resources is considered the most effective way to resolve most of the problems threatening its sustainability. Although there have been fisheries regulation in place to manage the fisheries resources, enforcement has always been difficult due to lack of personnel and resources. Therefore, fisheries legislation involving management measures to prevent the destructive harvests of Samoa's fisheries resources has very little impact in the management of Samoa's subsistence and inshore fishery resources. The option therefore is to work closely with fishing communities through the *matai* system. The key task is to convince communities that since they are resource users, they, not the Government, have the primary responsibility to manage their marine environment and its resources.

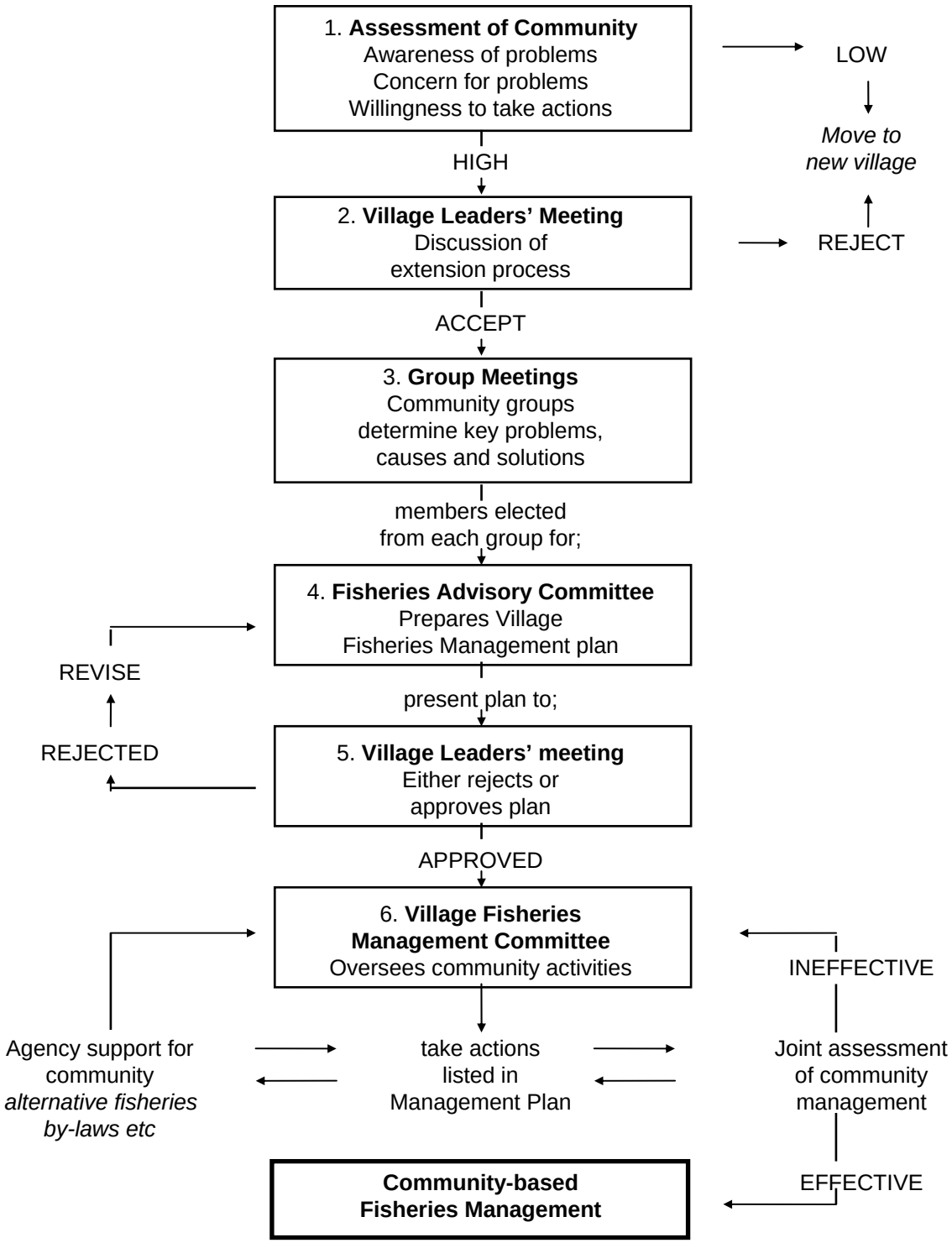
117 The ultimate goal of the Extension Program is to target fishing communities, being resource users to take charge for responsible exploitation and management of their subsistence and artisanal fisheries. The involvement of fishing communities in the management of these resources is considered the most effective way to resolve most of the problems threatening its sustainability. Although there have been fisheries regulation in place to manage the fisheries resources, enforcement has always been difficult due to lack of personnel and resources. Therefore, fisheries legislation involving management measures to prevent the destructive harvests of Samoa's fisheries resources has very little impact in the management of Samoa's subsistence and inshore fishery resources. The option therefore is to work closely with fishing communities through the *matai* system. The key task is to convince communities that since they are resource users, they, not the Government, have the primary responsibility to manage their marine environment and its resources.

118 The project involves a community-focussed extension process and the development of alternative sources of seafood. The extension process 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 support undertakings of the Fisheries Division. The stages of the extension process employed are described briefly below and in more detail in the following diagrams.

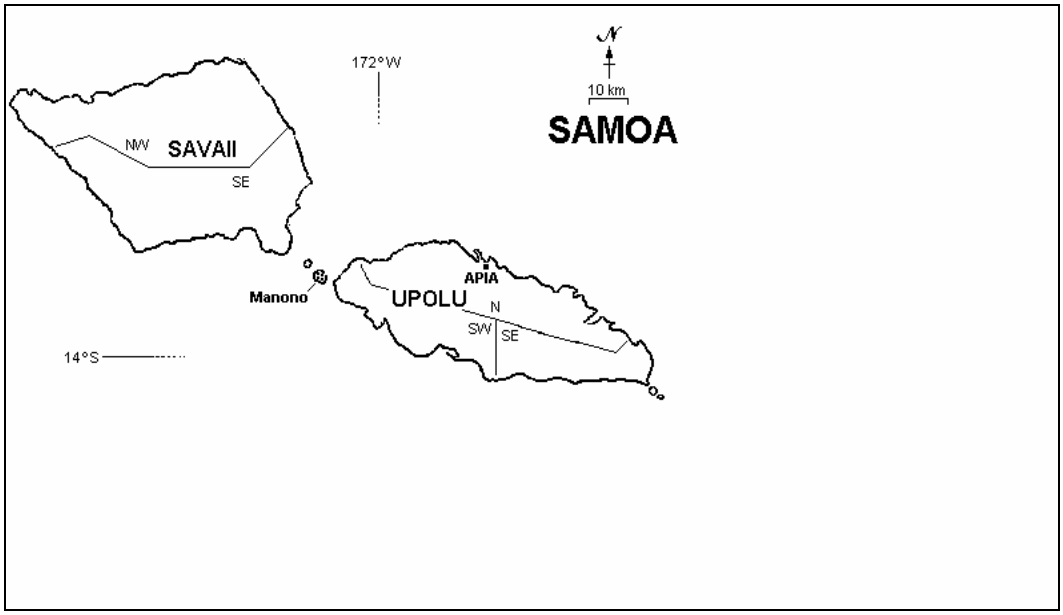
The Community Extension Process in Samoa.



The process can also be simplified with the following steps.



119The Fisheries Advisory Services (Extension) Section is divided into five sub-sections in which each section has a Fisheries Officer and two Fisheries Assistants. The Samoa Islands are also divided in five zones/areas. In each of these zones, a Fisheries Officer and two Fisheries Assistants are appointed to work closely with village communities in that particular zone. The zoning of the islands are shown in the following map.



The zones in which the Extension Staff work

120The Fisheries Advisory Services (Extension) Section in the past 12 months continued to work closely with communities/villages in ensuring that the undertakings listed in the Management Plans for each village are achieved on expected times.

Village Management Plans

121A total of 72 villages are now in the program and have produced their own Fisheries Management Plans. Out of this total, 45 are villages from Upolu and Manono Islands, and 27 are from Savaii. The Management 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 summarized below.

- Banning the use 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
- Production of village By-Laws.

122A target of ten new villages with approved Management Plans was achieved during this twelve-month period. These included four in Savaii and six in Upolu Island. The facilitation process in producing Management Plans for these villages took 5-6 weeks before approval by various village councils (fono).

Village By-laws

123One other most important part of the Extension Services work during this period is assisting the village fisheries management committees in the preparation and the processing of village by-laws. 'Village by-laws are village rules that have been prepared in accordance with relevant provisions of the national Fisheries Legislation and are accorded legal recognition in the Court of Law'.

124The main objective of village bylaws is for village laws to gain government recognition that enable the villages to prosecute and punish offenders accordingly. One of the advantages in employing bylaws as a management tool is the fact that these are village laws created by the people with a real interest in the management and conservation of fishery resources and the villages are therefore be more inclined to act on breaches of these laws. The steps to be taken in establishing bylaws are otherwise shown below.

The Bylaws Process

• Step 1 Formulation by the fono (village council)	FORMULATION
• Step 2 Consultation between the fono and Fisheries Division	CONSULTATION
• Step 3 Final checking and clearance by the Attorney General	FINAL CHECKING and CLEARANCE
• Step 4 Signing by Director of MAFFM	SIGNING
• Step 5 Gazette, publish, and distribution to neighbouring villages by Fisheries Division	GAZETTEING PUBLISHING and DISTRIBUTION
• Step 6 Monitoring and enforcement by village communities	MONITORING and ENFORCEMENT

125A total of fifty-seven bylaws have been formulated and currently enforced. These included 18 in Savaii and 39 in Upolu. Eleven new bylaws are now in the formulation process and awaiting approval by various authorities as shown in the above process.

Six Monthly Reviews (6MRs)

126Reviewing the performance of the villages with management plans is one of the major components of the extension work during the last twelve months. The review is conducted on a six-month period since the approval of the Village Management Plan. The review employs a quantitative approach whereby scores are given (as percentage) every six months to assess the effectiveness of the management plan and the

undertakings listed. It also allows the community to assess the performance of the Extension Services received by the village from time to time. The Extension staff conducted a total of sixty Reviews in Upolu and thirty five in Savaii during the last twelve months. The average scores are as follows.

Score (%)	No. of 6MRs conducted
85-100	29
51-84	28
<50	3
Total	**60**

Management plan reviews for Upolu for July 1999-June 2000

Score (%)	No. of 6MRs conducted
85-100	22
51-84	13
<50	-
Total	**35**

Management plan reviews for Savaii for July 1999-June 2000

Other Activities

Media Releases, Information and Publications

127. One other task that the Fisheries Advisory Section staffs have actively involved in was the dissemination of Fisheries information such as information sheets, publications and accurate reporting of events within the Division to the general public. This included the services provided to not only village people but to students at all educational level. Media releases to local newspapers, radio stations and any other media means was also the sole responsibility of the Extension Section. The following highlights some of the media releases produced during this 12-month period.

- *29th August 2000 – Samoa's Coral Reef Taskforce gets underway.* (This was to select Samoa's Coral Reef Taskforce team. This team would provide leadership in coral reef monitoring and management to stimulate and build up national ownership of Global Coral Reef Monitoring Network activities (GCRMN).

- *22nd December 2000 – More fishermen penalized.* (District Court has prosecuted two other fishermen, Mr. Lui Siva and Tivoli Lavea, for selling undersized fish at the Savalalo Fish Market, under regulation 8 of the Local Fisheries Regulations, 1995).

- *4th April 2001 – Fish Filleting and loining workshop underway. (*Mr.Frederic Chung Shing, a professional tuna filleter from Tahiti, conducted a workshop on filleting and loining tuna or long line bycatch fish species.

- *4th April 2001 – Seven Treated for fish poisoning.* (Seven people were reported being treated at the National Hospital as a result of fish poisoning. The incident happened following the consumption of fish respectively in the afternoon from one of the restaurants in Apia. The fish species was identified as *Tetraptus species* or marlin as its common name.

- *11th June 2001 – Survey shows Samoans eat plenty of Healthy Seafood* Results from a nationwide survey of villages' fisheries have been released. The survey showed that the total subsistence seafood catch for the year 2000 was 7169 tons, with a value of 45 million tala (USD13.5 million). The survey covered 20% of villages, and 5% of Samoa's households.

- *14th June 2001- Village Supplied Giant Clams.* The village of Tauaoo Faleasiu supplied giant clams for propagation at the Fisheries Division hatchery at Toloa on Tuesday 29th May 2001.

Radio Programs

128 There were two radio programs conducted by Mr.Atonio Mulipola and assisted by one of the Reasearch Section staff. These programs emphasized the importance of the Fisheries Regulations and the License Procedures for Fish export both at the commercial and non-commercial level (faaoso).

129Two of the Extension staff also took part on a Radio Talk–back show on 2AP. This program was hosted by the Division of Environment and Conservation of the Department of Lands, Survey and Environment as an effort to promote public understanding on biodiversity issues and conservation measures

Displays

- Aquarium, Information Sheets and Posters for the Biodiversity Day 2001.

- Information Sheets and Posters for the Seventh Day Adventists Primary School at Lalovaea on the 6th July 2001

Future Activities

- Continue to work closely with Fisheries Management Committees in villages who have produced Management Plans.
- Introduce Community based fisheries management into new villages.
- Conduct six-monthly reviews for all villages in the program.
- Assist villages with processing and formulation of Village Bylaws.
- Keep the public informed of Fisheries related issues.

APPENDIX 6: Output 18.0 Fish Market Services

Operation

130Fish Market Services implemented by the Division is currently available only on Upolu at the Apia Fish Market. The service centres on providing the public with a hygienic and available market place to sell and buy fishery products. Revenue is collected through table rentals to the fishermen that sell their products at the Fish Market.

131The daily operation of the Apia Fish Market involves the management and maintenance of the "open" side of the market for the general public for the trade of fishery products. The operation is managed by a Senior Fisheries Officer and two permanent staff (rental collectors) who collect table rental fees. The rental collectors also assist with the enforcement, at the Fish Market, of minimum size limits applied to certain fish and invertebrates. Cleaning and sanitation are carried out by 3 casual workers before and after the general public trade fishery products. They also ensure that the market is hygienically clean at all times.

132The fish market operates every day. The opening hours are: 06:00 to 17:30 on Mondays to Fridays; 06:00 to 13:00 on Saturdays; and 05:00 to 08:30 on Sundays. However, opening hours for Saturdays and Sundays were limited during the year to 4 working hours each upon instruction from the Ministry's Corporate Services. The limited opening hours on Saturdays and Sundays are insufficient for the fishermen to sell their fish as well as for the public that buy fish on these days.

Revenue Collected

133During the 2000-2001 fiscal year period, the total revenue collected at the Apia Fish Market from table/block rentals amounted to ST60,772 This is over the projected amount of ST60,000. The table/block rental during the year remained at ST4.00 and ST5.00 a block. Table 30 summarises revenue collected on a monthly basis during the year.

Table 30: *Monthly revenue collected at the Apia Fish Market during the 2000/2001 fiscal year period.*

Year/Month	Revenue Collected (ST)
2000	
July	5242
August	4736
September	4654
October	4676
November	4965
December	5177
2001	
January	4794
February	5008
March	5117
April	5192
May	6017
June	5194
	60772

Future Activities

- Continue to operate and maintain the Apia Fish Market on a daily basis
- Continue with the general maintenance of the Fish Market
- Ensure that cleaning and sanitation are carried out at all time
- Assist the Division with the enforcement of minimum size limits on fish and invertebrates exposed for sale at he Fish Market
- Ensure that the fish sold via the Fish Market is of good quality. This can be achieved through advising fish sellers to practice HACCP principles such as storing fish on ice before and during sale.

APPENDIX 7. Training and Workshops

FD offered Training and Workshops

134Table 31 summarises the training provided by the Fisheries Division for local fishermen and exporters and other local training where staff had attended during the 2000/2001 period. Commercial Fisheries Extension Service with technical assistance from the Secretariat of the Pacific Community and funding assistance from NZODA and AusAID has continued to run numerous training and workshops targeting the private and local stakeholders. Likewise Research, Assessment and Management Services and Fisheries Extension Advisory ServicesSection hosted several training with financial support from the Ausaid sponsored fishery project and the local budget. During the year, staff have the opportunity to further enhanced their capabilities by attending some training offered by local agencies.

***Table 31**: Summary of local training and workshops held in 2000/2001*

Workshop/ Training	**Dates**	**Objective**	**Sponsored/ hosted/**
Altimetric Mapping	3/9/2000	To train the local fish exporters and fishermen in obtaining and interpreting altimetric maps from the internet for locating tunas and productive fishing grounds	FD
Tuna Grading	12/12/2000	To assist the local fish exporters determine and grade fresh tuna for export markets.	SPC & FD
Tuna Loining and Filleting	2/4/2001	To train the workers from the various local Fish Processing Establishments on loining and filleting tuna and other by-catch species which cannot be wholly exported.	SPC & FD
Outboard Engine Repair and Maintenance	30/4/2001	To train the participants from Savaii on various ways to operate, repair and maintain the outboard engines	FD
Fish Handling and Quality Control	31/6/2001	To address the issue on high level of rejection from the Cannery in Pago Pago and to come up with remedial measures to alleviate the problem	StarKist FD
Tilapia fish farming		To promote new methods of tilapia culture the development of fish farm	FD
MAFFM/PSC Induction Training course	13-17/11/2000 15-17/5/2001	To train new staff recruited on PSC regulations as well as procedures and conditions on work.	PSC, MAFFM
Computer training	6-12/10/2000 13-17/12/2000 Dec/2000	Introduction to MS Word, Access and Excel	
Fisheries Boarding Officer Course		To train staff on procedures and protocols of boarding fishing vessels caught illegal fishing in Samoa's EEZ.	USA Coast Guards
2nd In-house Legal workshop	Jan 2001	To train Authorised Fisheries Officers on the Fisheries Regulations and procedures of investigating infringements.	PLO, MAFFM
Prosecutor Workshop	2-6/3/2001	To train staff on procedures of prosecuting fisheries related cases in Court.	PLO, MAFFM
Post harvest fisheries	10-12/4/2000	To train staff and school teachers on some post harvest methods of preserving seafoods. Additionally, it launches some school books for post harvesting useful for school children.	USP-MSP
Intermediate Microsoft Excel. Samoa. 2001	5-9/2/2001	To train staff on the use of Excel application especially those whom had the introductory training on Excel.	Pacifique Computers
Safety at Sea	2-4/5/2000	Train staff on safety elements on the sea	MTC
Workshop on Community Based Fisheries Program in Samoa with Tanzania Team	21/8/2000	Briefing workshop for the study team from Tanzania visited Samoa to look at the Community-based fisheries management programme.	FD

Recruitment and Selection Criteria	27/9/2000	To familiarise with new and reformed procedures for staff recruitments and selection.	PSC

Overseas training

Workshop/ Training	**Dates**	**Objective**	**Sponsored/hosted/**
Marine Diesel Engine (NZ)	2-15/12/2000	To train local participants on the operation and repair of diesel engines	SPC/NZ
Mechanical engineering/diesel	7/12/2000	To train on out and in board engines maintenance and operations	SPC/NZ
Co-Management Study Tour (NZ).		To provide an insight to New Zealand's approach to fisheries management, in particular the interaction between NZ Ministry of Fisheries and the fishing industry and the development of co-management models.	SPC/NZ
Giant Clam Spawning Attachment (Tonga)	31/10-14/11/2000	To received hands on and practical experience and skill on the propagation process of giant clams and other bivalves.	JICA
Community Based Fisheries Management in Am. Samoa	29/11-1/12/2000	To assist in the establishment of the Community-based fisheries management in Am. Samoa.	SPC

APPENDIX 8.

ACTIVITIES, MONITORING AND REPORTING OF THE COMMERCIAL FISHERIES EXTENSION SERVICE 2000/2001

07/00	CF-MAC sub-committee meeting concerning tuna management plan	Determine the licensing system for the tuna longline fleet.
07/00	CF-MAC meeting No. 8	Approved tuna management plan for the fishing industry, approved the proposal for the construction of a breakwater and docking area for the tuna longline fleet in Apia
07/00	Sub-committee meeting of the Cabinet Development Committee regarding Marina proposal	Survey the Vaiusu Bay area to determine the most appropriate site for the marina for the commercial fishing fleet
07/00	Marina Report to the Cabinet Development Committee	Submitted a report concerning the most appropriate location for the marina
07/00	Tuna longline reel for the "super alia"	Assisted in the procurement and installation of the tuna longline reel
08/00	Monitoring Control and Surveillance committee meeting no:4	Discussed a plan of action to enforce the sea safety regulations concerning manning certification to encourage enrolment at the Maritime School of Training
08/00	Management plan for the Fisheries Wharf	Drafted a plan to divide the Fisheries Wharf into zones for specific activities to alleviate the congestion
08/00	Proposal for the construction of a jetty near the Fisheries Wharf	Drafted a proposal to construct a 70 m jetty to moor alias to alleviate the congestion at the Fisheries Wharf
08/00	Alimetric maps for determining productive fishing zones	Alimetric maps issued from the internet to assist fishermen in determining productive fishing zones
08/00	Fish Import Statistics from American Samoa Report	Visited the COS Sampac cannery and Customs Department statistics sections to obtain fish import data from Samoa
09/00	Samoa's Longline Newsletter No. 2	Articles concerning the tuna management plan, safety at sea, financial management computer program etc.
09/00	Altimetric map training	Trained local fish exporters and fishermen in obtaining and interpreting altimetric maps for locating tunas
09/00	Marine Diesel Engine Training	NZODA agreed to fund three participants for two week diesel engine mechanical course at Nelson Polytechnic. Total funding NZ$20,000
09/00	Funding for a commercial fishing fleet marina at Mulinu'u	Chinese government agreed to fund the construction of a marina at Mulinu'u point. Total funding $4.2 million
09/00	Monitoring Control and Surveillance meeting no.5	Discuss the enforcement of sea safety regulations on October 16
09/00	National Seafood Safety Monitoring Service proposal	Drafted a proposal to NZODA for funding of technical assistance for the establishment of a National Seafood Safety Monitoring Service
10/00	Report of financial analysis for the new super alia	Financial analysis report based on the results of the Ulimasao's fishing trials
10/00	CF-MAC meeting no.9	Issues concerning the funding of the marina by Chinese government, rejection rates from the canneries, Star-Kist loining plant, acceptance of tuna management plan
10/00	Fisheries Wharf fuel depot	Fuel depot for the fishermen at the Fisheries Wharf completed
10/00	Tuna management plan sub-committee meeting no.1	Draft a list of the regulations for implementing the tuna management plan
10/00	Monitoring Control and Surveillance meeting no. 6	Finalise action plan for enforcing the sea safety regulations in 16 October
10/00	PCC meeting for October	Presented report on the progress of the CFES for the last 6 months. Main topics: Cabinet approval of tuna management plan, high rejection rates at the canneries, enforcement of the sea safety regulations
10/00	SPC Tuna Grading workshop request	Request for technical assistance sent to SPC to conduct the

		workshop. Training section accepted the request.
10/00	Rejection of export tuna report for CF-MAC	Report detailing the reasons for high rejection rates in 2000 and recommendations to reduce reject in the future
10/00	Samoa Polytechnic School of Maritime Training Course Advisory Committee meeting	Discuss the course program for 2001 and changes in curriculum, in particular fisheries training
10/00	Tuna management plan sub-committee meeting no. 2	Finalise draft of regulations for tuna management plan
10/00	Surveys of rural fishing ports for navigational markers	Port Authority, MOT and CFES conducted a survey of Poutasi channel for navigational markers.
11/00	Opening of fuel depot	Official opening of the fuel depot at the Fisheries Division to assist fishermen
12/00	Samoa Longline Newsletter No. 3	Articles concerning tuna management plan, enforcement of sea safety regulations, altimetric mapping, marina, high rejection rates of exported tuna
12/00	Tuna grading workshop (4 days)	Tuna grading for the export of fresh tuna conducted by SPC with assistance from SFP
12/00	National seafood safety monitoring proposal Phase 1 -AusAID	National seafood safety monitoring proposal Phase 1 to establish guidelines and regulations to monitor seafood safety. Funding of SAT40,000 approved by AusAID
12/00	CF-MAC meeting No. 10	Issues concerning enforcement of sea safety regulations, high rejection of exorted tuna, navigation markers for the rural fishing ports, regulation for the tuna management plan
12/00	Progress of the Commercial Fisheries Extension Service of Samoa Milestone 37 completed	Report concerning the activities of the CFES including support for the CF-MAC, sea safety, seafood safety, infrastructure requirements for the tuna fishery etc.
12/00	National Seafood Safety Monitoring proposal Phase 2 NZODA	Draft of National Seafood Safety Monitoring proposal Phase 2 completed for submission to NZODA
01/01	National Seafood Safety Monitoring Phase 1	Consultant completed Phase 1 of the AusAID funded project
01/01	Tuna Exports Report for 2000	Completed report of estimates of tuna catch, exports and rejection for 2000
01/01	Financial Analysis for the Ulimasao 20 trips	Completed the Financial Analysis for the 20 trips completed by the Ulimasao
01/01	Survey of navigational markers for Siumu	Completed survey for placement navigational markers in Siumu passage
02/01	Samoa Longline Newsletter No.4	Articles concerning seafood safety, fishing gear technology, tuna vessel licensing, tuna exports and Ulimaso fishing trials
02/01	CFES take over data entries for the tuna longline fishery	Collect and enter data concerning fishing effort and tuna exports
03/01	Co-management manual	Began a co-management manual in collaboration with Training Section of SPC
03/01	Report for the National Seafood Safety Monitoring Program completed	Report concerning the feasibility and procedures for implementing the program
04/01	Tuna loining workshop	3 day tuna loining workshop conducted by SPC with assistance from CFES 25 participants
04/01	CF-MAC meeting No. 11	Address issues concerning tuna licenses, tuna exports, navigation lights, sea safety enforcement and reciprocal fishing agreements
05/01	Outboard engine repair and maintenance workshop Satuiatua	Conducted workshop for 18 participants for 2 days in Satuiatua
05/01	Co-management workshop in New Zealand	2 week workshop in Wellington and Nelson on co-management system
05/01	Marina for the commercial fishing industry	The Chinese government signed over USD$1.3 million for the construction of a marina for Samoa's fishing fleet
05/01	Draft for co-management manual completed	Draft of co-management manual for commercial fisheries sent to SPC for approval and publication
05/01	Training Needs Analysis completed for the fishing industry	Interviews with fishers, boat owners, boat builders and fish exporters to determine training needs for the industry

06/01	Information campaign concerning the poor quality of tuna	Meetings with industry stakeholders, distribution of pamphlets, radio and television
06/01	Training of staff in procedures for drafting funding proposal for training and other projects	Trained two local counterparts in procedures, conducting training needs analysis, protocol in writing reports and drafting proposals for funding
06/01	Training of staff in procedures for determining the annual total catch and effort for the commercial fishery	Training workshop in determining the total catch, total exports, calculating the foreign revenue earnings from the commercial fishery and the total effort
06/01	Enforcement of the sea safety regulations continues	Number of fishermen have been charged with non-compliance to the sea safety regulations

APPENDIX 9

ULIMASAO FISHING TRIPS DETAILS

Trip #	*Dates*	*Positions*	Starting time	Finishing time	# of sets	Average # hooks per set	Fuel Used (ltrs)
1	16.05.00	1439S 17130.3W			2	620	390
	17-05-00	14492S 17148.3W	0655	1000			
		14494S 17148.6W					
		14426S 17137.2W	1540	0115			
		15079S 17202.2W					
	18-05-00	14561S 17155.4W	0720	1015			
		14563S 17155.5W					
		14485S 17144.8W	1405	2315			
2	5.06.00	14357S 17132W			3	710	430
	06-06-00	14454S 17149.1W	0640	0918			
		14451S 17150.3W					
		14353S 17139.8W	1435	2240			
	07-06-00	14382S 17130.1W					
		14377S 17148.2W	0700	1005			
		14366S 17149.9W					
		14374S 17136.9W	1600	2335			
	08-06-00	14344S 17142W					
		14275S 17205W	0650	0955			
		14274S 17101.4W					
		14313S 17149W	1512	2256			
3	16.06.00	12522S 17053W	0635	0904	3	720	465
	13-06-00	13014S 17108W					
		13004S 17104.4W	1430	2250			
		1254S 17055.4W					
		1258S 17107.1W	0620	0908			
	14-06-00	13094S 17122W					
		13085S 17122.4W	1526	2330			
		12588S 17111.2W					
		12506S 17120.3W	0640	0930			
	15-06-00	13014S 17135.6W					
		13007S 17136.5W	1530	2330			
		12516S 17124.2W					
4	24.06.00	1311S 17334W			4	730	750
	25-06-00	1317S 17352W	0700	0950			
		1316S 17353W					
		1308S 17341W	1515	0140			
	26-06-00	1308S 17346W					
		1316S 17405W	0648	0958			
		1315S 17405W					
	27-06-00	1304S 17355W	1442	0140			
		1312S 17337W					
		1315S 17356W	0900	1155			
	28-06-00	1314S 17356W					
		1313S 17342W	1520	2315			
		1327S 17309W					
		1330S 17326W	0715	1015			
		1331S 17325W					
		1327S 17312W	1445	2200			

5	03.07.00	1309S 17054W			4	730	460
	04-07-00	1309S 17114W	0640	0925			
		1309S 17114W					
		1310S 17059W	1500	2350			
		1310S 17105W					
	05-07-00	1312S 17121W	0700	0940			
		1312S 17122W					
		1310S 17109W	1510	2315			
		1302S 17059W					
	06-07-00	1312S 17115W	0700	0950			
		1312S 17115W					
		1304S 17105W	1500	2245			
		1302S 17108W					
	07-07-00	1313S 17124W	0650	0940			
		1312S 17124W					
		1303S 17113W	1535	0035			
6	10.07.00	1301S 17112W			3	735	425
	11-07-00	1310S 17128W	0640	0920			
		1310S 17129W					
		1303S 17119W	1515	0010			
		1302S 17125W					
	12-07-00	1300S 17144W	0650	0935			
		1259S 17146W					
		1302S 17125W	1500	2400			
		1300S 17130W					
	13-07-00	1257S 17149W	0630	0925			
		1357S 17150W					
		1259S 17136W	1515	0040			
*7	18.07.00	1308S 17146W			1	730	225
	19-07-00	1304S 17206W	0635	0920			
		1305S 17207W					
		1308S 17154W	1510	2300			
8	04.08.00	1226S 17145.5W			3	1100	620
	05-08-00	1228S 17206W	0610	0910			
		1228S 17207W					
		1224S 17156W	1440	0910			
		1224S 17156W					
	06-08-00	1241S 17218.5W	0920	1340			
		1241S 17219W					
		1224S 17202W	1700	0310			
		1250S 17200W					
	07-08-00	1258S 17224W	0800	1130			
		1258S 17226W					
		1253S 17207W	1552	0206			
9	10.08.00	1326S 17305W			2	1150	580
	11-08-00	133S 17323W	0640	1000			
		1334S 17324W					
		1328S 17305W	1545	0740			
		1328S 17305W					
	12-08-00	1333S 17326W	0800	1118			
		1332S 17327W					
		1326S 17313W	1710	0925			
10	15.08.00	1305S 17259W			3	907	410
	16-08-00	1303S 17122W	0625	0935			
		1303S 17124W					
		1304S 17104W	1520	0100			
		1304S 17107W					
	17-08-00	1300S 17127W	0650	1000			
		1300S 17128W					
		1303S 17110W	1550	0310			
		1303S 17113W					
		1300S 17126W	0700	0850			
		1300S 17127W					
		1302S 17118W	1720	2130			

11	21.08.00	1253S 17126W			2	1200	390
	22-08-00	1254S 17149W	0640	1000			
		1254S 17150W					
		1253S 17129W	1550	0045			
		1255S 17131W					
	23-08-00	1252S 17152W	0640	1000			
		1252S 17153W					
		1255S 17134W	1545	0010			
12	13.09.00	1252S 17113W			3	1040	630
	14-09-00	1306S 17131W	0637	0933			
		1307S 17132W					
		1252S 17119W	1513	0108			
		1250S 17120W					
	15-09-00	1303S 17139W	0619	0940			
		1302S 17125W					
		1247S 17123W	1601	0250			
		1247S 17127W					
	16-09-00	1302S 17149W	0642	0957			
		1301S 17150W					
		1248S 17132W	1642	0428			
*13	19.09.00	1253S 17112W			2	1065	370
	20-09-00	1307S 17130W	0617	0931			
		1306S 17131W					
		1253S 17115W	1600	0313			
		1254S 17114W					
		1310S 17138W	0630	1042			
		1309S 17139W					
		1255S 17120W	1641	0302			
14	27.09.00	1240S 17139W			3	866	630
	28-09-00	1252S 17215W	0624	1018			
		1252S 17216W					
		1239S 17158W	1607	0357			
		1339S 17159W					
	29-09-00	1248S 17225W	0627	1021			
		1247S 17225W					
		1239S 17202W	1606	0736			
		1237S 17202W					
	30-09-00	1245S 17213W	0745	0933			
		1244S 17213W					
		1239S 17204W	1749	2315			
15	23.10.00	1250S 17156W			3	1046	610
	24-10-00	1309S 17216W	0701	1141			
		1309S 17215W					
		1253S 17201W	1714	0209			
		1238S 17200W					
	25-10-00	1254S 1722.2W	0633	1000			
		1253S 17225W					
		1240S 17209W	1710	0255			
		1243S 17213W					
	26-10-00	1300S 17215W	0610	0943			
		1300S 17236W					
		1246S 17221W	1424	2225			
16	6.11.00	1230S 17126W			3	840	670
	07-11-00	1246S 17148W	0609	0943			
		1246S 17147W					
		1234S 17128W	1650	0301			
		1236S 17129W					
	08-11-00	1256S 17148W	0551	0930			
		1256S 17147W					
		1242S 17130W	1612	0350			
		1243S 17130W					
	09-11-00	1252S 17139W	0521	0758			
		1252S 17138W					
		1246S 17130W	1304	1724			

17	14.11.00	1506S 17125W			3	1026	660
	15-11-00	1519S 17147W	0600	0933			
		1518S 17146W					
		1509S 17126W	1642	0348			
		1509S 17126W					
	16-11-00	1526S 17147W	0531	0905			
		1525S 17146W					
		1514S 17127W	1713	0524			
		1514S 17127W					
	17-11-00	1522S 17148W	0533	0855			
		1523S 17147W					
		1516S 17126W	1318	2219			
18	27.11.00	1447S 17120W			3	926	600
	28-11-00	1504S 17143W	0548	0939			
		1504S 17144W					
		1453S 17128W	1626	0315			
		1454S 17128W					
	29-11-00	1504S 17140W	0606	0821			
		1505S 17142W					
		1459S 17134W	1743	0010			
		1502S 17136W					
	30-11-00	1520S 17156W	0606	1013			
		1520S 17156W					
		1508S 17141W	1511	0237			
19	5.12.00	1258S 17123W			3	633	520
	16-12-00	1322S 17136W	0553	0922			
		1322S 17135W					
		1300S 17124W	1500	0111			
		1251S 17127W					
	17-12-00	1301S 17145W	0546	0917			
		1300S 17143W					
		1250S 17123W	1632	0406			
		1252S 17131W					
	18-12-00	1303S 17140W	0624	0630			
		1302S 17140W					
		1254S 17133W	1725	2335			
20	11.12.00	1242S 17216W			2	775	350
	12-12-00	1301S 17158W	0606	0935			
		1301S 17150W					
		1343S 17105W	1720	0759			
		1306S 17134W					
	13-12-00	1309S 17119W	0420	0626			
		1308S 17120W					
	14-12-00	1307S 17131W	1133	1720			
21	16-01-01	1434S 17242W			3	980	610
	16-01-01	1455S 17259W	0623	1012			
		1456S 17260W					
		1441S 17246W	1619	0219			
		1443S 17246W					
		1505S 17231W	0618	1012			
	17-01-01	1504S 17232W					
		1449S 17248W	1650	0324			
		1451S 17248W					
		1507S 17301W	0642	0941			
	18-01-01	1508S 17304W					
		1457S 17255W	1835	0225			
*22	24-01-01	1227S 17154W			2	1020	500
	25-01-01	1247S 17210W	0623	1001			
		1246S 17210W					
		1229S 17155W	1645	0354			
		1228S 17166W					
		1247S 17213W	0713	1051			
		1247S 17213W					
		1230S 17159W	1559	0157			

23	05-02-01	1229S 17154W			3	870	562
	06-01-01	1247S 17212W	0627	1018			
		1247S 17212W					
		1230S 17159W	1658	0344			
		1231S 17160W					
	07-01-01	1241S 17224W	0643	1020			
		1242S 17225W					
		1231S 17205W	1728	0403			
		1239S 17207W					
	08-01-01	1244S 17220W	0723	0913			
		1244S 17220W					
		1240S 17211W	1615	2126			
*24	13-02-01	1314S 17139W			1	990	250
	14-02-01	1319S 17207W	0736	1132			
		1318S 17207W					
		1310S 17150W	1656	1357			

* Trips aborted due to mechanical problems

APPENDIX 10: PROSECUTED CASES FOR FISHERIES REGULATION

Results of Court Cases for Local Fisheries Regulation 1995 for the year 20000-2001

Date	Name	Village	Age	Offence	Penalty	Court Type
07/06/00	Pueleo Faamoe	Leulumoega	40yrs	Exposing for sale 1 egg bearing lobster	A fine of $400.00 to be paid from 07-23/06/2000 and in default 6 weeks imprisonment	District
31/10/00	Ola Taputaua	Tufulele	44yrs	Exposing for sale 1 egg bearing lobster	A fine of $150.00 to be paid within 14 days and in default 1 month imprisonment	District
31/10/00	Pulu Iopu	Luatuanuu	38yrs	Selling 1 egg bearing lobster	A fine of $150.00 to be paid within 14 days and in default 1 month imprisonment	District
19/12/00	Lui Siva	Eva	29yrs	Exposing for sale 19 undersize fish and Exposing for sale 3 undersize lobsters	A fine of $300.00 for 19 undersize fish and also $300.00 for 3 undersize lobsters was given to be paid within 2 weeks and total fine to be paid is $600.00 and in default 6 months imprisonment	District
07/11/00	Ioane Mau	Falelatai	30yrs	Exposing for sale 1 undersize mudcrab	Withdrawn by Ming Lang Wai (Prosecutor) due to villagers of Falelatai know no person with such an identity	District
31/10/00	Lapa Toni	Satuimalufilufi	38yrs	Selling undersize surgeon fish	Did not appear in court. A warrant of arrest was issued by Judge Enoka Puni	District
07/11/00	Farani Alo	Motootua		Selling	Warrant of arrest was issued by judge Enoka Puni	District
11/12/00	Tivoli Lavea	Afega	36yrs	Selling undersize fish to Tivoli 1)alogo 2) Pone	Warrant of arrest Already issued Sentencing date is 27/08/2001	District

(f). Court cases to be prosecuted

Name	Village	Age	Offence	Calling Date	Court Type	Date of Offences
Aigaga Tavita	Moataa	49yrs	1) fishing for 3 egg bearing lobsters 2) Fishing for 1 undersize lobster 3) Exposing for sale 3 egg bearing lobsters	27/08/01	District	05/11/00

			4) Exposing for sale 1 undersize lobster			
Pati Sumu	Leone	25yrs	1) Selling 3 egg bearing lobsters 2) Selling 1 soft-shelled lobster 3) Selling 7 undersize fish	27/08/01	District	17/09/00
Pelema Galu	Manono	30yrs	1) Fishing for 1 egg bearing lobster 2) Exposing for sale 1 egg bearing lobster	27/08/01	District	05/11/00
Pueleo Faamoe	Leulumoega	40yrs	1) Fishing for 2 egg bearing lobsters 2) Fishing for 1 soft-shelled lobster 3) Exposing for sale 3 egg bearing lobsters 4) Exposing for sale 1 soft-shelled lobster	27/08/01	District	05/11/00
Vavao Afitu	Moataa	50yrs	1) Fishing for 1 egg bearing lobster 2) Possessing 1 egg bearing lobster 3) Exposing for sale 1 egg bearing lobster	27/08/01	District	05/11/00