

FISHERIES DIVISION ANNUAL REPORT

July 2004-June 2005

Apia

August, 2005

1. MISSION STATEMENT

The Fisheries Division is dedicated to the Vision, Goal and Objectives as stipulated in the Statement of Development Strategy (SDS) and the Ministry's Corporate Plan (2002-2005) goal of "Growing a Healthy and Wealthy Samoa. Below is the mission statement of the Division that promotes the overarching goal:

"Promotes the optimum and ecologically sustainable use of the country's fishery resources and the development of suitable alternatives to harvesting of depleted resources in order to maximize benefits to Samoa".

2. OVERVIEW

The following highlights represent the major achievements the Fisheries Division achieved during the fiscal year 2004/2005.

2.1 INSHORE FISHERIES

■ ***Fisheries annual landings:*** The estimated total volume of inshore fishery products landed and sold via domestic markets and outlets for the period of 2004-05 is 120.6 metric tonnes and valued at about 1.15 million tala. Finfish species accounted for 93% and was traded on an average of \$7.69/kg. Crustacean accounted for 4.2% and was sold at an average of \$23.25/kg.

■ ***Resource monitoring:*** There were eleven community-managed fish reserves monitored during 2004 - 2005 period including one new fish reserve assessed and six permanent monitoring sites.

■ ***Researches:*** Three major inshore fisheries research projects were initiated in 2004-05 period and the researches are for two years each.

(i) *Monitoring and Evaluation of Community-base fish reserves.* Seven villages have been selected, consulted and trained on the simplified monitoring and reporting methodologies with assessment exercises been conducted by village members and the Fisheries staff. Of the eleven main activities and outcomes of the project, eight has been achieved so far over the last 18 months.

(ii) *Managing inshore spawning fish species, aggregating sites and spawning grounds.* Ten key inshore fish and invertebrate species were selected and their gonads had been collected and weighed to determine the times of spawning. Traditional management knowledge and understanding of critical spawning and aggregating areas were also gathered, database and analysed. The remaining activities of the project are; a) Determining GSI and HSI b) Conducting research on selected spawning sites, c) Information Production on spawning time and site and d).Awareness Campaign Program.

(iii) *Fish & Shellfish Poisoning Project.* The project has yet to begin the sampling component, however, the collection of anecdotal and traditional information has been completed, as has the gathering information through a literature search.

- **Consultation and Awareness:** Consultative workshops for stakeholders of the Inshore section were conducted through the various research projects involving the communities. Inshore staff also presented findings and general information on the section at several of the Advisory Services section's stakeholder workshops.

2.2 OFFSHORE FISHERIES

- **Low volume of tuna catches landed:** Poor catch landings have been persistent in past two years. A small improvement was recorded in the last two months of this fiscal year, however, did not result in many fishers rejoining the fishery. Estimated landings of longline fishery amounted to about 2,000 metric tonnes (mt) and valued at approximately \$30 million tala. A total of 1,956 mt of tunas and other pelagics were exported, valued at \$20.8 million tala. Major tuna species were the predominant (94%) fish species landed and exported. Bottomfish accounted for 94 mt and valued at \$619 thousands tala.

- **Tuna Management and Development Plan 2005-2009:** The Tuna Management and Development Plan (TMDP) was launched in June 2005. This plan contains various management and development objectives and strategies that will guide Samoa's tuna fishery in the next 5 years.

- **Onshore and Offshore infrastructures:** A new ice making machine for Savaii was approved and four FADs were deployed off Saleaula, Apolima, Palauli and Falealili.

- **Tuna tagging research:** A 3-year tuna tagging research project continued this year which resulted in 17 live albacores tagged and released from 30 longline fishing trips undertaken. This research gathers information on the biology, feeding and movement of the albacore (*Thunnus alaluga*) tuna.

2.3 AQUACULTURE

- **Giant Clam Lagoon Monitoring:** Giant clam nurseries in the Fisheries program continued to show mixed performance in the maintenance of their giant clam stocks. Several giant clam broodstocks were stolen from the nursery at Palolo at times unknown to the caretaker. During the year, only 17 communities have giant clams remained in their nursery growouts.

- **Giant Clam Hatchery:** Importation of giant clam broodstocks from Tonga for the sole purpose of spawning activities commenced in June 2005 under the Import Risk Analysis protocol for such pursuit. A successful spawning for giant clam *Tridacna maxima* in June 2004 resulted in 100 giant clam juveniles produced and reared at Toloa Hatchery.

- **Tilapia:** Tilapia propagation for this fiscal year was slow due to the weak conditions of broodstocks particularly female brooders to carry out spawning activities. New fish farms at Faleapuna, Laulii, Faleseela and Chanel College were stocked with about 3,000 tilapia fingerlings during the year.

- **Sea urchin:** A successful spawning of sea urchin *Tripneustes gratilla* produced 3,000 settling juveniles. A total of 300 sea urchin juveniles were stocked at Vaiala lagoon area while the remaining were used as broodstocks and for the tasting show.

▪ **Research:**

(i) *Trochus Relpenshing*: The ACIAR funded Regional Trochus Replenishment Project ceased in June 2005, after three years. Successful spawning of *Trochus niloticus* resulted in 300 settling juveniles currently reared at Toloa Hatchery.

(ii) *Tilapia Hatchery Propagation*: The SPC supported tilapia project on hatchery propagation successfully produced 3,000 fry.

▪ **Aquaculture Development Plan**: The Aquaculture Development Plan has been formulated and drafted after extensive consultation with relevant stakeholders, technical personnel and the Fisheries Division.

▪ **Import Risk Analysis**: The IRA Protocol for importation of giant clams has been formulated and produced with the assistance of the SPC.

2.4 FISHERIES ADVISORY SERVICES (EXTENSION)

▪ **Village Fisheries Management Plan**: One new village (Fogatuli Savai'i) with approved Management Plan was achieved during this period. The consultation process in producing the Management Plan resulted in relevant and practical undertaking between the Fisheries and the village being identified before the final approval by the village council (fono). Another village, Moataa, has delayed the process because of other commitments even though they expressed interest in the programme.

▪ **Village By-laws**: Ten (10) new Village by-laws that were produced with extensive consultations with the village groups and are presently awaiting formal approval and adoption.

▪ **Information Dissemination**: Dissemination of Information Sheets on all fisheries and marine resources issues in ensuring that the people of Samoa are well informed was one of the key functions of the Advisory Section throughout the year. Three issues of the Fisheries quarterly newsletter was also produced and distributed to interest groups, stakeholders and village communities in the Village Fisheries Management Program.

▪ **Review of Village Fisheries Management Plan**: The Management Plan format had been reviewed with changes made, incorporating the various recommendations not only from Fisheries Staff but also from the Management Committees.

▪ **Six monthly reviews of Management Plans**: A total of 20 Management plan reviews in Upolu and 15 in Savai'i were conducted within the 12 months period. The method was designed to assess the degree of success and performance of the undertakings stipulated in the Village Fisheries Management Plans (VFMP).

▪ **Community Workshops**: Eight community consultation workshops were conducted during the last 12 months. The workshops were focussed on producing VFMP, village fisheries by-laws and means to strengthen community-based programme.

▪ **"No Fishing Allowed" signboard shelter**: A total of five signboard shelters to identify Fish Reserve areas were constructed in five villages. Two in Upolu and three in Savai'i.

2.5 ENFORCEMENT AND REGULATION

- **Licensed Fishing Vessels:** A total of 45 fishing vessels were licensed during the year which accounted for 32% of the total fishing fleet. Of the total licensed fleet, classes A, B and C represented 66%, 4% and 11% respectively. The vessels in classes D and E were accounted for 13% and 4% correspondingly.
- **Surface and aerial surveillance:** A total of four surface surveillance on the Nafanua patrol boat were during the year where a Fisheries Officer joined the staff of the Police Maritime. Supports from the New Zealand and Australian Air Forces resulted in the implementation of two aerial surveillance trips of Samoa's EEZ
- **Reported cases under Fisheries Regulation:** A total of 106 cases were reported for infringing fish and shellfish size limits, soft-shelled and egg-bearing regulations. The nature of offences caused by fishers/fish-vendors was mainly fishing, possession and selling of regulated fishery products as stated in the Local Fisheries Regulation 1995.
- **Village by-laws cases:** Three reported cases were filed for by-laws but only one case has been registered in court. All the 3 cases took place in Upolu; one in Fagalii and two occurred in Apolma and Mulifanua. Overall, the nature of the reported cases was people caught fishing inside the village Marine Reserve and the cases were filed and for Court process.
- **Foreign fishing vessels boarding and Surveillance:** Two foreign fishing vessels (ie. Pukapuka, TeRavakai) were boarded and inspected in accordance to the Transshipment Regulation throughout the year. A total of 12 boarding and inspections were conducted.

3. SUMMARY OF ACTIVITIES

3.1 INSHORE FISHERIES

Fishery annual landings: Surveys of inshore fishery landings were conducted throughout the reporting period as an ongoing activity. The data is collected from the Apia Fish Market, Fugalei Agricultural Market, Salelologa Market, and along the Apia-Faleolo roadside three times a week. Information collected is divided into groups such as finfish, crustaceans, invertebrates, and processed seafood items. The estimated total landings of inshore fishery products for the 2004-05 period are 120.6 mt, valued at \$1.15 million. Finfish landed and sold were dominated by species of the fish families *Acanthuridae* (unicornfishes, surgeonfishes – 35.2%), *Scaridae* (parrotfishes – 23.3%), and *Mugillidae* (mulletts -9.1%). Other inshore seafood products that were sampled in surveys included crustaceans (1.7 mt), bivalves (9.5 mt), echinoderms (10.5 mt), and processed marine products (10.6 mt).

Research: Research activities implemented by the Inshore Fisheries section within the 2004/2005 reporting period include three (3) PDF-funded projects – the Monitoring of Aggregate Spawning Species and Sites project, the Monitoring of Community-Owned Fish Reserves project, and the Fish and Shellfish Poisoning project, and monitoring under the ACIAR Trochus Replenishment Project.

(i) *Monitoring of Aggregate Spawning Species and Sites Project:* A two weeks survey was conducted in Savaii and Upolu where fishers and village members provided important information on spawning species, times and areas. This included the creating of a database to

enter, store and analyze the obtained data. The survey involves information about traditional knowledge of fishers on spawning fish species. In the period of January to June 2005, the sampling activity was started. This involved collecting fish samples. Fish were bought from the Apia Fish market every month. Sampling involved measuring the total length, total weight, gonad-weight and liver-weight

(ii) *Monitoring of Community-Owned Fish Reserves Project:* Two seminars and a training was carried out on the 2004-2005 period for the seven communities in the Monitoring and Evaluating of Communities-base fish reserves project.

((iii) *Fish and Shellfish Poisoning Project:* Village surveys were conducted on Upolu, Savaii, and Manono. The purpose of the surveys was to collect anecdotal information on traditional indicators and remedies for fish poisoning.

ACIAR Trochus Replenishment Project: Monitoring of seeding sites stocked with *Trochus niloticus* sourced from Fiji and Vanuatu continued on a quarterly basis. Recovery of seeded trochus varied for the three (3) seeded sites, ranging from good at the Papa-i-Puleia site, to moderate at the Saleapaga site, and nil recovery at the Saoluafata site. Extensive searches at the Saleapaga and Saoluafata sites were also conducted without success.

Resource monitoring: Altogether, 11 community-owned fish reserves and permanent sites have been initially and re-assessed for the 2004/2005 period. The main objective of the assessments is to identify record and report on the ongoing changes on substrate coverage such as live corals and algae as examples, and the fish and invertebrates abundance over a certain period of time. One new reserve was initially assessed, while six other re-assessed fish reserves are the permanent monitoring sites.



Resource monitoring undertaken underwater

The results show that three main substrates predominate including the live corals with the least of 29%, algae group with 30% and the abiotic group which consist of 32%. Coral bleaching was noted but only made up 1% of the total substrate coverage. The fish count showed that both the Damsels (*Damaiselle sp*) and the Humbugs (*Dascyllus aruanus*) are the most common and abundant while in the invertebrates count the prickly fish (*Stichopus chloronatus*) and the sea urchin (*Echinometra sp*) were the most abundant.

3.2 OFFSHORE FISHERIES

Low volume of catches landed and exported: The total weight of fish exported was estimated at 1956.2 mt valued at \$21 million tala. All unloaded fish are measured at the wharf by the port samplers providing the basis for “total catch landed” by the fleet. All catches from vessels sampled are recorded into prescribed forms and are entered after quality checks into the offshore fisheries tuna database for analysis. Exported catch are recorded at the offshore section in two ways, the purpose for this is to monitor and verify that there are no discrepancies between the two data sets. One data set is received from Central Bank while the other is from the Seafood safety certificate used to monitor quality of catches exported.

Launch of the Tuna Management and Development Plan (TMDP) 2005-2009: The TMDP was launched after extensive consultations with tuna fisheries stakeholders. In essence, the TMDP

was to promote through management and development strategies the direction in which the fishery will be heading in the next five years.

Some key projects of this plan were achieved in this financial year. These are;

- The review of license fees which were amended. These fees were based on the revenue earned from catch exported in the year 2004.
- The proposal for Strengthening Sea Safety. This proposal covers various areas that range from training of fishers to the setup of a fund to source spare parts of fishing vessels. The spare parts are
- Assistance from Japan has been approved for the extension of the Fisheries Wharf, renovation of the Fish Market and Fisheries Centre. This assistance valued at more than 5 million tala, has been in the pipelines for several years. Construction is set to begin in January 2006.



Albacore being captured for tagging and release

Offshore Research implemented: Two offshore fisheries research projects are currently implemented by the offshore section, albacore tagging and cetacean interactions. 17 albacores were tagged and released from 23 vertical long line trips and 7 horizontal long line trips.

Dissemination of information from the commercial fisheries: This is a very important aspect of the work of offshore, especially as it is heavily involved in providing the logistics as well as advice to the Commercial Fisheries

Management Advisory Committee.

- Four quarterly CF-MAC meeting and two Safety Committee meeting were convened.
- Two radio programs were aired discussing various issues of offshore fisheries.
- Public displays (during the Agro-show, World Food Day and Equal Opportunity Days) provided other avenues for Offshore fisheries work to be promoted and publicised.
- Four Commercial Fisheries Newsletter issues were disseminated to offshore fisheries stakeholders.

Onshore/Offshore infrastructures: Four fish aggregating devices were deployed to assist fishers to improve their fish catches. The logic behind FAD's based on the principle that fish are attracted to floating devices, is to attract fish to a strategic location where fishermen can easily access.

Seafood safety and Fish Exports: A total of 295 consignments of fish exports were sent from Samoa this fiscal year. Regular auditing of fish processing establishments to ensure compliance to Seafood Safety standards. Weights, species composition and value of fish exported were obtained to provide relevant export data and to provide a "paper trail" for re-tracing pathway, in the case of rejected fish.

Effort and Catch surveys: A total of 228 boatcounts were conducted for Apia, 8 for Savaii and 10 for rural areas of Upolu. Surveys for effort and catch continue to be the main focus of the offshore fisheries monitoring work. The surveys for catch landings are conducted at the Fish Market, Fisheries Wharf and two unloading areas for bottomfish at Apolima and Savaii. Daily boatcounts for Apia and monthly boatcounts for Savaii and Rural Upolu was continued for this year (effort).

3.3 AQUACULTURE

Giant Clam Lagoon Monitoring: Communities with giant clam broodstocks have varied results for performance with regards to maintenance, ranging from very good to very poor. 200 giant clam juveniles were distributed to Apolima-uta and Matautu Falelatai for grow-out. Currently, only 17 community farms are still operational from the 36 communities that were involved in the program previously.

Giant Clam Hatchery: A successful spawning of *Tridacna maxima* in June 2004 produced an estimate of 100 giant clam juveniles. The Import Risk Analysis for importation of giant clams was produced and utilized to quarantine *T. derasa* and *T. gigas* broodstocks from Tonga.

Tilapia: Tilapia production has slowed down for this fiscal year 2004 – 2005 due to the injurious condition of broodstocks in particular, female brooders. 3000 tilapia fingerlings were distributed to Laulii, Faleapuna, Faleseela and Chanel College.



Farming tilapia in a cage method

Sea urchin: Spawning of *Tripneustes gratilla* resulted in an estimate of 3000 settling juveniles. Site assessments for lagoon grow-out of sea urchin juveniles were carried out for two sites; Manono-tai and Satitua. 300 sea urchin juveniles were stocked at Vaiala for grow-out. The first Sea urchin culture workshop was held in January 2005. The first Tasting Show for sea urchin products was carried out in April 2005. 500 copies of the Sea urchin Information Sheet were produced for sea urchin Farming Technique.

Researches: (i) *ACIAR Trochus Replenishment:* The fiscal year 2004 – 2005 was final for the ACIAR Trochus Replenishment Project. A successful spawning in October 2004 produced an estimate of 300 trochus juveniles currently reared at the hatchery at Toloa.

(ii) *Tilapia Hatchery Propagation:* Successful spawning of *Oreochromis nilotica* produced 3000 fry. The activity is supported by SPC

3.4 FISHERIES ADVISORY EXTENSION

The decline in inshore catches of fish and shellfish in the country due to human activities, overexploitation, destructive fishing methods and the aftermath of two recent major cyclones has greatly reduced the availability of marine protein resources, causing concerns for the nutritional status of village communities. Since government actions and national laws to protect fish stocks have not previously proved successful, a culturally appropriate extension process has been used to encourage and motivate village communities to manage their own marine resources.



Community consultation on fisheries issues

Community-based Fisheries Management: The Advisory Services Section continued to work closely with village communities in the management of coastal fisheries and marine resources.

- One new village has produced Village Fisheries Management Plans.

- One new community-owned fish reserves been declared and enforced.
- All villages with Management Plans reviewed. Eighty percent (85%) of all villages reviewed have good performance and committed to carry out undertakings pertaining to the management of coastal and inshore fishery resources.
- Five sign board shelters have been constructed for Saoluafata, Fagalii, Auala, Vaisala and Papa.

Information dissemination:

- Eight Community workshops been conducted in villages with Management Plans.
- Four issues of Fisheries Quarterly Newsletter has been produced and distributed to villages in the Fisheries Community Management Program.
- Two radio talk-backs on SBC radio were conducted on issues to strengthen CBMP.

3.4 REGULATION & ENFORCEMENT

Fishing Vessels: A total of 45 Fishing Vessels were licensed within the period of July 2004 to June 2005 and represented 44% of the total active number of the fishing fleet in Samoa. Regular monitoring and enforcement of unlicensed vessels resulted in three (3) fishing vessels been caught and subsequently have their licenses been renewed. One fishing vessel (alia) was caught fishing without a valid fishing license during the surface patrol by the Nafanua patrol boat.

Boarding Inspections / Berthing Management: Berthing inspection is conducted daily to ensure fishing boats are complying with the Fisheries wharf management plan. Twelve (12) boarding inspections were conducted by Authorised Fisheries Officer to ensure compliance to transshipment regulation. The Foreign fishing vessels were the Island of Pukapuka and the Te Ravakai and they are both licensed in Cook Island but based in Apia.

EEZ Surveillance: A total of 4 surface surveillance trips where a Fisheries Officer joined the Nafanua patrol boat to monitor illegal, unregulated and unreported (IUU) fishing activities within Samoa’s EEZ. Continue supports from the Australian and New Zealand Air Forces enabled the implementation of 2 aerial surveillance trips for IUU activities.



Officer landed from aerial surveillance

Size Limits: Ongoing monitoring and enforcement of the Fisheries regulation resulted to a total of 106 reported cases; 73 undersized fish, 26 undersized and egg bearing lobsters, and 7 undersized crabs. Only 38 cases prepared and submitted for Court proceedings.

By-Laws: Collective effort by the Fisheries and communities in enforcing village by-laws culminated to 3 cases of fishing within the Fagalii, Apolima and Lalovi fish reserves been prepared and submitted for Court proceeding.

Seafood Processor: Annual renewal of seafood processing license based satisfactory performance of seafood safety requirements were issued to Apia Export Fish Packers (AEFP), CJ Exports Company Ltd and the Tradewinds Fish Company.

Awareness: Licensing of Fishing Vessels and Scuba Regulations awareness were promoted through TV ads during the Star Search 2004.

3.6 FISH MARKET

Number of fishers selling fish increased: A total of 12,346 member of the fishing community sold fish at the fish market this financial year.



Fish vendors selling their products at Apia fish market.

No case of illness and outbreak was reported: There were no cases of illness or outbreak of disease was reported. The staff of the fish market worked closely with the Fisheries enforcement officers to improve compliance with Fisheries regulation pertaining to size limits and fish quality.

Cleanliness and fish quality maintained: Fish quality was maintained throughout this fiscal year by the market staff. Daily maintenance programs ensured the quality of fish sold at the market was of the highest standard.

4. TRAINING AND WORKSHOPS

4.1 INSHORE FISHERIES:

Training/Workshops	Date	Venue	FD Participant
Seminar on Integrated Inshore Resources Management in Tropical Island Countries	Sept - Nov 2004.	Okinawa, Japan	Nofoaiga Tausa
Fisheries Statistics and Management	November 2004	Nadi, Fiji	Anama Solofa
Fisheries Legislation and Community-Based Fisheries Management workshop	1 st – 4 th April 2005	Honolulu, Hawaii	Anama Solofa
Management and Conservation of Coral Reefs in Asia-Pacific Regions ,	30 th May – 29 th July 2005	Okinawa, Japan	Joyce Samuelu

4.2 OFFSHORE FISHERIES

Training/Meeting	Date	Venue	FD Participant
Outboard motor maintenance workshop		Apia	Fisheries staff
Basic Navigational Skill training		Apia	Fisheries staff
Fishing Technologies workshop		Apia	Fisheries staff
Seafood Safety Management workshop	November 2004	Singapore	Ueta Faasili
Seminar on Fisheries Cooperation in Pacific		China	Savali Time
Seafood Management workshop		Niue	Ueta Faasili
Nelson Fisheries Course	Aug 04-Feb 05	NZ	Michael Forsyth

4.3 AQUACULTURE

Workshop/Meeting	Date	Venue	FD Participants
Tilapia hatchery propagation	On-going	Fisheries, Apia	All Aquaculture staff
Open Water I Certified Divers	August 2004	Pacific Quest, Apia	Aleluia Taise, Siulagi Pepe
ACIAR-funded project on Integration of	June 2005	Broome, WA	Malwine Lober

Broodstock Replenishment			
National Aquaculture Consultation Workshop	14 th – 15 th Dec 2004	IRETA Alafua, Apia	Aquaculture Staff
Sea urchin Culture Workshop	20 th Jan 2005	Local	Aquaculture Staff
Aquaculture Study Tour	5 th -14 th July 04	Malaysia	Malwine Lober; Dan Su'a; Mulipola Atonio
Australasian Aquaculture Conference	27 th – 29 th Sep 04	Australia	Malwine Lober
Shellfish Aquaculture Technique	11 th Oct – 23 rd Dec 04	Okinawa, Japan	Alleluia Taise
Marine Microalgae, Culture	17 th Apr 04 – 6 th May 04	Cairns, Australia	Alleluia Taise

4.4 ENFORCEMENT

Training	Date	Venue	FD Participant
Legal Implementation of Obligations Arising from the WCPFC workshop	19 – 23 Dec 04	Nadi, Fiji.	Kerryn Kwan (PLO)
Monitoring, Control & Surveillance /Training Course	18 – 22 Feb 05	Canberra, Australia.	Pouvave Fainuulelei (SFO)

5. REGIONAL AND INTERNATIONAL ISSUES

Western and Central Pacific Fisheries Convention (WCPF).

The WCPF Convention was formally come into force on the 19th June 2005 after 13 contracting parties endorsed and signed the convention. The WCPF convention was resulted from the United Nations Fish Stocks Agreement which concluded in 1995 and this Agreement includes the arrangements for ensuring that shared stocks including tuna are not damaged by uncontrolled fishing in the high seas outside the national waters.

Now, both FFA members and distant water fishing nations involved in fishing for tuna in the Western and Central Pacific Ocean has agreed on a Convention to apply the principles of the UN Fish Stocks Agreement in our region, which include the establishment of a new Commission.

Samoa will benefit from the new regional arrangement through stronger conservation of tuna resources and strengthening of Samoa's rights over tuna fishing.

6. CHALLENGES AND CONSTRAINTS

The Fisheries Division has undergoing a dynamic period both at domestic and regional levels. Major constraints faces by the Division during the years were:

6.1 Continue declining of tuna catches.

Tuna has been Samoa's mainstay for its economy as revenue earners over the past 5 years. However, catches of targeted tuna species have been significantly declined during the past two years. Consequently, many fishers and fishing vessels, especially of the smaller alias, have been inactive or ceased to operate because their operations were unfeasible. This is of course presents some daunting challenges for the Industry and the Government identifying and promoting relevant measures ensuring the commercial tuna fishing industry can be sustained and expectantly recovered if catches are improving.

6.2 Insufficient onshore infrastructures

Infrastructure requirements of the industry are presently inadequate. A major challenge for the Division and Government is addressing the deficient of infrastructures such as the wharf, market and airfreight capacity as to effectively and efficiently supporting the commercial fishing industry.

6.3 Western and Central Pacific Fisheries obligation

The new arrangements for management of highly migratory species also bring new challenges and responsibilities, and hence Samoa would need to strengthen tuna management and ensure that the new regional arrangements are applied in a way that would benefit Samoa. To efficiently performing our obligations, the Division must developments relevant domestic legislations incorporating management measures as per the convention. Staff capacity shall strengthening, thus accompany and promoting management responsibilities as stipulated by the convention.

7. RECOMMENDATIONS

The Government should consider supporting the tuna industry in whatever means possible, as to assure the industry will be sustained until the fisheries is recovered and the tuna catches are returning to normal. Recognizing the significant impact and potential benefits of the tuna fishery industry to the local economy, the government should therefore afford top priority to the developments of infrastructures and relevant requirements needed for improvements of the industry. Legal and technical capacities of Fisheries personnel must further enhanced enabling the execution of tuna fisheries management obligation productively.

8. ACKNOWLEDGEMENTS

The Fisheries Division would like to acknowledge with much appreciation, the invaluable contributions from the following agencies:

- Government of Australia (AusAID, ACIAR)
- European Union (EU)
- Global Coral Reef Monitoring Network
- Food and Agriculture Organization (FAO)
- Forum Fisheries Agency (FFA)
- Secretariat for the Pacific Community (SPC)
- Japan International Cooperation Agency (JICA)
- Secretariat for Pacific Regional Environment Program (SPREP)
- University of the South Pacific – Marine Studies
- University of the Southern Cross, Australia
- SOPAC

Mulipola T. Atonio P. Mulipola

ASSISTANT CHIEF EXECUTIVE OFFICER (FISHERIES)

APPENDIX 1: ADVISORY SERVICE

1. Introduction

The decline in inshore catches of fish and shellfish in the country due to human activities, overexploitation, destructive fishing methods and the aftermath of two recent major cyclones has greatly reduced the availability of marine protein resources, causing concerns for the nutritional status of village communities. Since government actions and national laws to protect fish stocks have not previously proved successful, a culturally appropriate extension process has been used to encourage and motivate village communities to manage their own marine resources.

The induction of Samoan villages into the Fisheries Community-based management program was initially facilitated by the AusAID Fisheries Extension and Training Project and the Fisheries Division, and has been in operation for the last 9 years.

Village management actions variously included the banning of chemicals, explosives and plant-derived fish poisons (*ava niu kini*), banning the smashing of corals (*faamo'a* and *tu'iga*) to catch fish, enforcing national laws on fish size regulations, controlling the use of nets and underwater torches for fishing at night, collecting and removing crown-of-thorns starfish, *Acanthaster planci*, banning the removal of beach sand and the dumping of rubbish in lagoon waters, and establishing fish reserves in parts of traditional fishing areas.

Reciprocally, to support community undertakings, the Fisheries Division has undertaken to provide various forms of assistance and technical training. For example, various species of giant clams such as *Tridacna derasa*, *Tridacna squamosa*, *Tridacna maxima* and *Hippopus hippopus* are provided to restock lagoon fish reserves and the introduction of tilapia (*Oreochromis niloticus*) to villages with suitable natural water bodies or ponds. In addition, regular demand-based technical training workshops in tilapia and clam aquaculture, fishing methods, gear technology, sea safety, fish handling and skills for small business management are held. The Fisheries Advisory Services Section has also undertaken to review all management plans after approximately six months of operation and then at appropriate intervals, to verify sustainability.

2. Status of Community-based fisheries management

To date, the Samoa Fisheries Division community-based fisheries extension program has assisted 82 coastal villages (Table 1) to develop Village Fisheries Management Plans. Management plans (VFMP) have specified the village resource management undertakings and conservation measures and, also the services and technical support required from the Government Fisheries Division. Most management plans have also included the establishment of small fish reserves within traditional fishing grounds. These fish reserves ranged in size from 5000 – 1500,000 square kilometres. Additionally, most of these villages have also posted bylaws to support their fisheries regulation action

3. New Village Management Plan

Fogatuli village has adopted community-based fisheries management measures following the approval of their **Village Management Plan on the 7th February 2006**. The Management Plan contains a range of community undertakings designed to conserve and rebuild fish stocks and to protect the marine environment. The facilitation process in producing this management Plan took 5-6 weeks before approval by the village council (fono) 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 spear fishing 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.

Moataa village also showed interest in the programme and the Fisheries Division conducted a First Fono meeting to introduce and provide details to the village council. Consultative meetings with various sectors of the village have been arranged but later delayed due to internal disputes.

Table 1: An overall summary of village communities in the Village/Community-based fisheries management program in Samoa

	UPOLU	SAVAII	Total
Total villages	55	27	82
Management Plans	55	27	82
MPA	46	26	72

4. Program review (6 Monthly Reviews)

One of the major activities carried out by the Extension staff during this 12-month period was to review management performance at regular intervals (6 months since the date of Village Fisheries Management Plan approval) to provide feedback concerning issues or changes. An assessment procedure was developed which attempted to gauge community support by quantifying adherence to resource management and conservation undertakings; outcomes of enforcement procedures; and consequences of fish reserves, aquaculture and other community undertakings.

A total of 35 reviews have been carried out, 20 in Upolu and 15 at Savai'i Island. Some have delayed the process due to many reasons. Some of these reasons included changes

in Village Fisheries Management Committee members, village commitment to other activities (e.g. Church annual meeting, Teuila Festival and Independence celebration, etc) and village disputes. Table 2 & 3 summarises scores obtained from the program reviews in the past 12 months.

Table 2. Results of Management plan reviews carried out in July 2004 to June 2005 period for Upolu

Degree of success	No. of Villages	Achievement rate(%)
80 % and over	16	80
50 - 79	3	15
< 49	1	5

Table 3: Results of Management plan reviews carried out in July 2004 to June 2005 period for Savaii.

Degree of success	No. of Villages	Achievement rate(%)
80 % and over	9	60
50 - 79	4	
< 49	2	13

5. Community Workshops

- A total of eight (8) community workshops have been conducted within this financial year.
The main objectives of the workshops were:
 - To strengthen the role and commitment of fisheries management committee (fmc) in the Management plans.
 - To assist communities in village by-law process, enforcement, investigation and prosecution procedures and to.
 - Improve effective collaboration with all villages in the CBMP.
- More than 100 people from 25 villages participated and some of them were from villages without management plans.
- Public awareness has continued to be an important component of the work of Advisory staff during this period. For example, two radio talk back show were conducted on issues relating to fish reserves and promoting CBMP.
- Four issues of Fisheries Quarterly Newsletter were produced and distributed to village communities.
- Information sheets were disseminated to schools, villages and the public during open days such as Avanoa Tutusa Career day, Environment Day, Science Fair competition and others.

6. Village Fisheries by-law

Village-by-laws is defined as village rules that have been prepared in accordance with relevant provision of the National Fisheries Legislation and are accorded legal recognition in the court of laws. Bylaws can include any measures that assist in the management of fisheries and marine environment and must apply equally to all citizens and individuals of Samoa.

In most cases, village communities take important fisheries regulations to form part of their village by-laws. Once they have agreed on this, they call into the Fisheries Division for more consultation as to the appropriateness of their rules. The Fisheries Division will then pass on the draft of the by-laws to the Office of the Attorney General for review. Once approved, the by-laws are required to be signed by the Chief Executive Officer of the Ministry of Agriculture and Fisheries. After signing, the by-laws will be taken to the Legislative Assembly to be published in the Official Gazette.

Once the by-laws come into effect anyone found breaching them is liable to a fine not exceeding 100 penalty units, and not more than 10 penalty units each day if the breach continues. The success of enforcement against outsiders will largely depend on the mutual cooperation between members of the public and the village fono concerned.

Within this fiscal year 2004/05, about ten village by-laws are now in the formulation process and awaiting approval by various authorities as mentioned above.

Fisheries Division will then advertise the by-laws in newspapers circulating around the country. Copies will also be distributed in neighbouring villages.

7. Trainings

7.1 Local training.

Three Extension officers (Ferron, Fosi and Aifiti) attended an in-house training workshop on Press Releases and Media report which was held in June 2005. The training provided staff with skills and knowledge to produce accurate reports as well as media releases and information on fisheries activities carried out. The participants were able to utilise their capacity in reviewing information sheets, producing management plans and Fisheries Quarterly newsletter.

7.2 Overseas Training

Magele Etuati Ropeti and Auatalavou Taua both attended the regional workshop on Fisheries Coastal Management held in Hawaii in March 2005. The workshop was an opportunity for Samoa to again share the success of its community-based fisheries management to other Pacific Island countries. On the other hand, Samoa has also learnt from other countries ways to improve and further maintain the sustainability of this program.

8. Challenges

The Advisory staff has experienced various difficulties during implementation of its work plan. This includes the lack of human resources as well as the expertise of the team. Some of the experienced extension staff has been allocated to other Section of the Division allowing new staff to be trained on extension work.

The inadequacy of facilities such as computers and printers to implement the task is one of the major challenges. Upolu Advisory staff has only one Desktop computer without a printer. Village Management Plan preparation, program review reports, monthly reports were all centralised in Upolu. Salelologa and Asau office computers were out of order for almost three months and therefore the workload faced by Advisory staff was one of the main challenges.

The working environment was also a threat. The extension room was leaking for months and no air condition as well.

9. Future Activities

- Continue to work closely with Fisheries Management Committees in villages who have produced Management Plans.
- Introduce Community based fisheries management (CBMP) into 4 new villages.
- Conduct 30 six-monthly reviews for villages in the program.
- Assist villages with processing and formulation of Village Bylaws.
- Carry out promotional programmes informed public of Fisheries related issues.
- Conduct fisheries socio economic survey to evaluate the status of (CBMP)
- Collect Boundaries of 20 village Fish reserves using the GBS device
- Develop and improve Extension Database system

APPENDIX 2: OFFSHORE FISHERIES

ALBACORE TUNA (*Thunnus alalunga*) TAGGING RESEARCH PROJECT

1. Background

Samoa consists of two main islands, Upolu and Savaii, and two smaller inhabited islands, Manono and Apolima. There are also four small-uninhabited islands. The total land area is approximately 2,934 sq. km. The island group is located at the western edge of Polynesia between 13°20' - 14°05'S and 172°55' - 171°15'W. The proximity of American Samoa, Tokelau, Wallis Futuna and Tonga, results in Samoa having the smallest Exclusive Economic Zone in the Pacific, covering an area less than 130,000 sq. km. The population is approximately 170,000, with 126,000 residents in Upolu and 44,000 in Savaii. According to the 1991 census, 89% are indigenous Polynesians.

Fisheries play an important role within the country and a wide variety of subsistence and commercial fishing is practised. Seafood is an important part of the diet in Samoa, and is a major source of dietary protein. Annual fish consumption is estimated to be 57 kg per capita per annum (Passfield *et al.* 2001). Fishermen harvested an estimated 7,165 t of fish, valued at SAT\$ 45 million, from inshore reefs and lagoons in 2000-2001.

The offshore commercial fisheries, in particular the tuna longline fishery, have become increasingly more important to the economy of Samoa. Catches from the tuna longline fleet, comprised of over 160 vessels, have contributed to over 90% of the foreign revenue earned from fish exports since 1996. An estimated 5150 t, worth approximately SAT\$ 45.8 million were exported in 2001 (Watt & Moala 2001).

The catch per unit effort (CPUE) of the tuna longline fleet has decreased from 94 kg per 100 hooks in 1994 to 57.4 kg per 100 hooks in 2000. If this trend continues by the year 2005 the CPUE could decrease to less than 30 kg per 100 hooks which will effect the economic viability of the fishery (King *et al.*, 1999).

There is a need for financial assistance to address issues that concern the management and development of commercial fisheries within Samoa's EEZ. The issues and concerns mentioned above needed to be addressed to ensure that fisheries resources are sustainable and to maximise benefits for Samoa. There is a need to conduct research activities to assess the status of the tuna stocks captured in Samoan waters and investigate the migratory pattern of albacore. Seafood safety regulations needed to be developed and implemented to reduce the level of tuna catch rejection. To strengthen tuna fishery exports internationally recognised seafood safety standards must be established to meet the requirements of Samoa's trading partners.

2. Introduction

Recent research on the migratory patterns of tuna has indicated that there are larger resident stocks in Pacific Island countries than previously thought. As 95% of fish exports to canneries in American Samoa consist of albacore tuna understanding the biology and migratory patterns of this species is critical.

The Fisheries Division implemented an albacore-tagging project with technical support from the Oceanic Fisheries Programme (OFP) of the Secretariat of the Pacific Community (SPC). This was all made possible with funding from the PDF funding administered by the FFA. Technical experts from OFP of SPC will conduct training of Fisheries personnel in the skills of tagging and releasing albacore, recording of relevant data and establishing a data-base to store albacore tagging data. The results of the tagging project will be analyzed by the Fisheries Division and OFP staff to determine growth rates and migratory patterns of albacore tuna in the region.

3. Objectives

The main objectives are:

- To facilitate scientific data collection and provide information about the behavioral patterns of albacore in the EEZ of Samoa
- Enhance the awareness of the Fisheries Division personnel on the implementation and analysis of technical data on the population dynamics of albacore

- Provide information for the Fisheries Division to base management decisions concerning tuna resources within Samoa's EEZ.

Method

The Fisheries Division's research vessel, *Ulimasao* was rigged up for the purpose. Two methods of long line fishing were practiced. Vertical long line was conducted around the Fish Aggregating Devices and horizontal long line was carried out in the normal fishing ground. The SPC technical expert was on board on the first trip to conduct practical demonstration on the handling of the fish and tagging techniques.

Vertical long line: Ten main lines were rigged from 1.28 mm nylon with branch lines made from the same size nylon. Each line was clipped to the float line on the sea surface with a float to sustain buoyancy. The main line is kept vertical reached to a depth of 350 metres with a 3 kg weight. The snoods (branch lines) 20 to 25 metres long are clipped along the main line at 50 metres interval with the top hook at 50 metre mark from the surface

. Vertical long line was conducted around the vicinity of three FAD deployed on the North side of Upolu island. (Leulumoega, Apia & Falefa). The lines were set to North from the North North East about .25 nm from the FAD or on the West side encircling the device in a semi circle.. This is to avoid the line drifting onto the FAD as the wind was coming from the East. The current was flowing at the same direction. The idea was to keep the line close to the FAD and to let it drift from a safety distance. Setting starts at 0700 and hauling begins at 1100 to 1200. Changes were made for shorter soaking time and longer branch lines. The operation was limited to 9 sets due to the unproductive fishing around the FAD. No sign of birds or fishes feeding on the sea surface. Small fishing boats use to hang around the FAD reported similar observation and move to searching for schools in the wild.

Horizontal Long Line: A 25-mile long line with 1000-1200 hooks deployed per set. The normal set up was to set the line early morning (0530 – 0700) and started hauling it in the late afternoon (1500-1600). Hauling times were varies allowing the line to soak for shorter period. The branch lines were also lengthened (20-25m) and the numbers were reduced between floats in an attempt to catch fish alive. A total of 23 sets were made deploying 7090 hooks.

FISHING TRIPS CATCH REPORT

Fishing Method	Number of Sets	No. of hooks Deployed	Catch (#'s)				
			ALB	YFT	BET	WAH	OTH
Vertical Long line	9	678	3		5		3
Horizontal Long line	23	7090	190	65	26	24	163

Results

The results shown by the fishing trials were far too low than expected. With such low catch the possibility of hooking up any live fish strong enough to be tagged is very rare.

Of the albacore landed from both methods about 90% were dead when hauled on board and the rest were too weak to be tagged. This prevented the crew from tagging any fish during the 15 trips undertaken.

The vessel was unable to complete the number of trips planned in this years activities as it suffered major engine problems one after another towards the end of this financial year when the catch landing was improved. Spare parts had to be sourced from overseas and this normally takes time.

Discussion

The bad season experienced by the fishing industry was sure not a good time in the first year of this programme's execution. From the previous experience with the vertical long line method there were better chances of catching a fish alive. However there were just no fish around the devises. The catch from the horizontal long line is far too low in comparison with the catch landed during the normal season. The effectiveness of the gear design and variations to catch live albacore cannot be determined at this time due to the same reason

The problems with vessels engine prevented the crew to complete the number of trips planned for this year especially it happened at the very time the catch landing started to improve.