

REPORT ON THE SEA FISHERIES OF WESTERN SAMOA

By

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<u>CONTENTS</u>	<u>PAGE</u>
INTRODUCTION	1
GENERAL DESCRIPTION OF WESTERN SAMOA	2
THE EXISTING FISHERIES	3
General	
Fishing Craft	
Fishing Grounds and Fishing Methods	4
Commercial Fishing and Marketing of Fish	8
Fishing Rights and Regulations	9
Present Status of Reefs and Lagoons	
THE FUTURE OF FISHERIES IN WESTERN SAMOA	10
General	
The Development of Ocean Fisheries	11
The Choice of Mechanized Craft for Ocean Fishing	
Two-Year Trial Plan	13
Staff	
Buildings and Shore Facilities	14
Boats	
Gear	
General Remarks	15
Tentative Budget for Two-Year Plan	16
THE IMPROVEMENT AND PROTECTION OF REEF AND LAGOON RESOURCES	18
Introduction of <u>Trochus niloticus</u>	
Fisheries Legislation	
ANNEXES	
I. I. A list of Fishes and Other Marine Products of Importance in Western Samoa	21
II. Sketch Plan of 25' Boat	23
III. Sketch Plan of 20' Canoe	24

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REPORT ON THE SEA FISHERIES OF WESTERN SAMOA

by H. van Pel

INTRODUCTION

At the request of the Government of Western Samoa, a survey of fisheries was made in this territory from 12 July to 8 August, 1960.

Observations were made on the reefs, lagoons and coastal areas of the islands of Upolu and Savai'i, and also at sea, between Apia (Upolu) and the East Coast of Savai'i. Due to temporary ill-health, a series of fishing trials planned to supplement these observations could not be completed during my stay and had to be postponed.

The opportunity was taken to examine some inland waters; their improvement, however desirable it may be, is quite unlikely to solve the problems of fish supply in Western Samoa and this aspect of fisheries will not be dealt with here.

In submitting this report as requested by the Government of Western Samoa, I should like to express my deep appreciation of the co-operation extended to me by His Excellency the Minister of Agriculture, by the Director of Agriculture, the Livestock Officer and other members of the Department of Agriculture, by a number of Government Officers, by the Harbour Master, the Staff of the Apia Observatory, District and Village Chiefs, and by a number of fishermen.

GENERAL DESCRIPTION OF WESTERN SAMOA

Western Samoa lies between $13^{\circ}26'$ and $14^{\circ}3'$ South and between $171^{\circ}23'$ and $172^{\circ}49'$ West.

The territory is composed of two large islands, Upolu (430 sq. miles) and Savai'i (703 sq. miles) and of a few smaller islands of which Manono is the most important.

Apia, the capital and main harbour of the territory, is on Upolu, 620 miles from Suva, Fiji.

The two main islands are mountainous, the highest summits reaching over 3,600 feet in Upolu and over 5,900 feet in Savai'i.

According to a census at 31st March, 1960, the total population of Western Samoa was 106,362, of whom 63,718 living in Upolu and Manono and 42,644 in Savai'i.

The main exports of the territory are copra, cocoa and bananas. While a number of cattle, pigs and poultry are raised on these islands, the sea still provides most of the food of animal origin consumed locally.

Samoa has a tropical climate, and the Apia Observatory recorded the following yearly averages over the five year period 1949-1953:

Mean temperature	$79^{\circ}8$ F.
Mean maximum temperature	$86^{\circ}1$ F.
Mean minimum temperature	$73^{\circ}8$ F.
Rainfall	107.7"
Rainy days	212

Mean wind speeds for the period 1948-1957 inclusive were recorded as follows:

Month:	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Speed (Knots)	5.2	5.4	4.4	4.3	5.1	6.7	7.0	8.1	7.8	7.1	5.4	5.5

The following wind direction frequencies were recorded at 09.00 hours in Apia in 1959:

Direction:	N	NE	E	SE	S	SW	W	NW	Calm
Days	13	18.5	186	21.5	12	8	12	16	78

Mean daily sunshine for 1958 was 7.3 hours.

THE EXISTING FISHERIES

General

Fishing, including the gathering of shellfish and other marine animals, is a very important activity in Western Samoa. The sea is the main local source of food of animal origin and in addition, Samoans are very fond of fish and seafoods generally. Practically all fish, even very small ones and sharks, are welcome on the table. Octopus, shellfish, crabs, spiny lobsters, turtle, sea-urchins and sea-cucumbers are also consumed and Palolo "worm", which is actually the spawn of Eunice viridis, is collected in great quantities each year in October and November and considered a delicacy.

There are few full-time fishermen. Most of the fishing is done by part-time fishermen of both sexes and all ages, generally for subsistence purposes. Some fish and other sea foods are sold but there is no fish-market in Apia or in the villages.

There is no export of fish or other marine products and actually, in spite of the fishing activities, imports are necessary. Frozen fish is obtained chiefly from New Zealand and tinned or processed fish from a number of countries.

Fishing Craft

By far the most common fishing craft is the outrigger canoe, propelled by paddles. Some canoes are now powered with an outboard motor. Special canoes for Bonito fishing are decked over at both ends, as they have to pass through the surf to reach the open water outside the reefs.

There are also in Samoa a few sportsfishing boats powered with outboards.

The total number of canoes actually in use is not known, but certainly reaches several hundreds. Canoes are used for lagoon fishing and, in good weather, for fishing outside the reefs, on the Ocean, but always in sight of land.

Fishing Grounds and Fishing Methods

The reefs surrounding Upolu and Savai'i are fairly close to shore, and the lagoon they enclose is generally shallow. Coastal flats, bays and fringing reefs are numerous along the coast. Outside the main reef, North of Upolu, the detailed chart shows several reefs which appear suitable for handling. There may be more such reefs in the vicinity of Savai'i, but no detailed chart was available. Fishermen do talk of rich submerged reefs over which they occasionally fish, when the weather allows them to take their canoes outside the main reef, and also provided they can find these choice grounds.

Bonito appear to be present all the year round in the immediate vicinity of the Samoan islands, and, as mentioned earlier, special decked canoes are used to catch them, although this type of fishing is done in fair weather only. I personally observed 3 schools of Bonito North of Apia during a one day trip, 3 more during the 90 minutes passage from Upolu to Savai'i and two on the passage back to Upolu. All the schools were followed by seabirds.

Bonito fishing is a daytime activity and the gear used consists of a long bamboo pole equipped with one or more lines (I saw up to 6 lines on the same pole) and lures generally made of Blacklip pearl-shell with a barbless hook of tortoise shell, horn or bone. The size and colour of these lures vary and the purpose in having several such lines on the same pole is to enable the fisherman to change from one lure to another quickly, according to light conditions, the size of the fish, or the prey they are chasing at the moment. The hooks which are not in use are fixed near the butt of the pole.

The lure is trolled along the surface of the water, the canoe being paddled. This type of fishing is known as Alo-atu, and can be used with mechanized craft, as proved by a sportsfisherman from Apia using a 21' plywood canoe and a 5HP outboard motor. A crew of two men each bonito canoe, and the largest craft (20') may bring in as many as 50 fish in a day.

Another deep sea fishing method is used for shark fishing. A rattle made of a number of coconut shells is shaken in the water to attract the sharks. Then a bait of pig or dog flesh is used to manoeuvre the fish in position and it is caught with a noose.

Shark boat crews run up a flag for each shark caught, so that their total catch is known before they reach shore. As mentioned earlier, shark is eaten in Samoa. Shark livers are eaten raw and an adult Samoan fisherman indicated he was accustomed to eat about 60 cubic inches of it at a time; children receive smaller quantities of raw liver.

In addition to Bonito, Yellowfin Tuna, Spanish Mackerel, Barracuda, and Dolphin are caught outside the reef. Sailfish, Marlins and other billed fish are caught by sportsfishermen in the same waters. Farther offshore, fifteen miles out and more, Albacore is also present, as shown by the catches of Japanese longliners and by recent longlining trials with the Ketch "Trade Winds". All the species mentioned here have also been caught near Tutuila, American Samoa, 35 miles ESE of Upolu, where a longline training scheme operates within 20 miles of shore.

Scod and Flying fish are also present outside the reefs of Upolu and Savai'i, but are rarely caught there.

Although deep sea fishing is common, by far the greater part of the fishing activities take place on the reefs and in the lagoon. Shell gathering at low tide is generally the work of women and children. Great quantities of shellfish are gathered. Men and women also dive for sea urchins and men dive on the outer edge of the reef in good weather for giant clam.

Under-water spearfishing is common in the lagoons and on the outer edge of the reefs. The divers use goggles, a shanghai or catapult known as Fana-meme'i, and a short steel spear. They have become so skilful that practically every fish seen is speared, even if it is of small size. This method is highly destructive.

Catapults are also used at night, to spear fish by the light of a pressure lamp. This method is called Lama-tofu. Hand spears are also used.

Several types of fixed traps called Pa are used. They are made of wire-netting supported by stakes. The size of the traps and the arrangement of the wings vary considerably. The main types include: a single wing and pen, a double V shaped wing and a pen, and an L shaped wing with two pens. Some of the wings, constructed of wire netting, are lengthened with garlands of banana leaves. Dimensions of wings range from 20 to 80 feet for all-purpose reef traps, and reach about 200 feet in the large V traps. The latter are usually taller than in the small traps, so that mullet cannot escape by jumping.

In Magia, on the island of Upolu, rectangular fish-traps made of wire netting stretched over a wooden frame $6\frac{1}{2}' \times 6\frac{1}{2}' \times 13'$ are used in conjunction with a surrounding net to catch shoals of scad. The opening in one side of the trap is fitted with a door and the fish can be kept alive for a few days in the trap itself. These traps are transported on large double canoes. The owner of these traps, Mr F.D. Stowers has recently built a trap of the same type $12' \times 10' \times 23'$ for use with V shaped net wings. He has also sought permission to make fishponds in the lagoon for keeping and raising fish.

Small bottom traps called Tau-faga are made of coconut roots and used to catch fish. Special eel traps, called Faga-pusi are made of boards or of coconut roots. Ola tutu'i is a large basket which is set on the reef and garnished with stones and coconut leaves among which small coral fish will take shelter when chased by the women.

Hook and line fishing includes a number of methods, of which bonito fishing, already mentioned, is one. Handling and pole fishing with baited hooks or lures of pearlshell, feathers, etc., is widely practised. Apart from the bonito lures, most of the hooks used as modern steel ones and, although I have been informed that traditional Samoan hooks were still used, I did not observe any myself.

A lure made of stone, shell fragments and leaves and attached to a short line is used to catch octopus. This method is called Ta'i-fe'e.

Several types of nets are used, such as castnets, drag seines, surrounding nets and nets into which the fish are driven by a line of fishermen equipped with poles or with a scare-line. Wide-meshed turtle-nets are made of coir rope (sennit); the turtles are driven into these nets and become entangled. With the exception of turtle nets, most of the nets used in Samoa are made from machine-made cotton netting bought in the local stores and mounted by the fishermen with wooden floats and shell or lead sinkers.

A complete enumeration of all fishing methods defined by different local names would needlessly burden this report; out of more than 60 names, many designate methods which are very similar to each other. The main methods used in Samoa are listed below:

- I. Gathering by hand (mostly shellfish, crabs, crayfish, octopus, sea-cucumber)
- II. Fishing with traps
 - (a) fixed traps
 - (b) bottom traps
- III. Driving Fish
 - (a) into shallow water
 - (b) into a net, basket or trap.

IV. Spearfishing

- (a) with hand spears
- (b) with mechanically propelled spears

V. Fishing with nets

- (a) handnet (dip net)
- (b) drag seine
- (c) surrounding net
- (d) gillnet

VI. Hook and line fishing

- (a) handling
- (b) pole and line fishing (from shore or reef)
- (c) trolling (with or without pole)

VII. Noosing or snaring (sharks)

VIII. Stupefying with poison

IX. Stunning or killing with explosives.

In addition, the efficiency of some of these methods is often increased by attracting fish by sound (shark fishing) or by light.

Practically all these methods are used by large numbers of fishermen in the reef and lagoon areas. Some techniques are simple, but effective and even in many cases destructive.

Commercial Fishing and Marketing of Fish

Organised commercial fishing with motorboats does not exist in Western Samoa. As mentioned earlier, there are few full-time fishermen. There is however a considerable quantity of fish and seafoods sold. At the time of my visit, giant clams 8" to 8½" were sold for 2 shillings each. In Apia, strings of 10 atule (scad) sold for 4 shillings, near the "Fish Tree" which is the open-air fish-market. Shark generally sells at 4d. a pound and other types of fish at over 1sh. a pound. Prices for frozen local fish in the stores are about 50% higher.

Although there are no fisheries statistics, I estimate that in 1959, over 1500 tons of fish and 500 tons of other marine animals were taken from the sea and inland waters of Western Samoa.

Facilities for the construction and maintenance of small wooden motorboats are available in Apia, including a slip and engine repair shops.

Ice is available, although expensive. Facilities for freezing fish exist ashore. A reasonable range of fishing gear is available, including nylon lines, but no nylon nets are found.

While Samoans are motor-minded and can handle motor-boats, there are no fishermen capable of navigating out of sight of land.

Fishing Rights and Regulations

Fisheries problems are dealt with by the Department of Agriculture but there are no fisheries regulations in Western Samoa.

Customary fishing rights and chiefly rights on the products of fishing exist; for instance, around Manono island, only the inhabitants of Manono are entitled to catch mullet and atule; during the whitebait runs in the ~~Gatavai~~ river, in Savai'i, whitebait fishing is the exclusive right of one village. The largest fish in a catch, or a turtle, if one is caught, is reserved for the Ali'i or Chief, in some places.

Present Status of Reefs and Lagoons

It has already been said that many of the methods used on the reefs and in the lagoons of Western Samoa are very efficient and even destructive. In fact these fishing grounds are subject to characteristic overfishing. The population of these islands is fast increasing and more people will fish the same areas in the future. In addition, fishing methods and fishing gear are constantly being improved and a much too high proportion of small fish is taken.

It is fortunate indeed that some of the species taken on the reefs and in the lagoon, such as atule, do not live permanently in these areas. Atule provide a fairly steady supply from January to July in the vicinity of Apia and apparently for a longer season on the West coast.

Coral reefs and lagoons are a type of environment easily depleted of its fauna. When a reef has been fished intensively, it sometimes takes years to return to its original condition. The utmost caution is therefore necessary to ensure proper exploitation of these resources without destroying the balance.

THE FUTURE OF FISHERIES IN WESTERN SAMOA

General

Under present conditions, any massive increase in fish production from the reef and lagoon areas is out of the question. Such increases can only be expected from a development of fisheries on the Ocean, in sight of land.

The only improvements which can be brought to lagoon fisheries are protective measures and to a certain extent the introduction of Trochus niloticus.

During my stay, I heard talk of a possible export of fish. Such a possibility is quite remote, and it would not be advisable to entertain hopes in this direction for the time being, unless foreign capital and foreign specialists are involved.

It would be much more important to establish a local market fishery operated by Samoans fishing outside the reefs but in sight of land with small mechanized craft. It is only when such a fishery has been successfully established and operated for a few years and when enough fishermen have been trained, that development on a larger scale, with a view to export, can be contemplated.

At the present time, on the basis of an estimated annual consumption of 55 lbs of fish and seafoods per capita, with a total population of 110,000 foreseen in the near future, efforts should be made to reach a production of 6,050,000 lbs. a year.

If my previous estimates of production are correct an additional supply of about 675 tons must be obtained annually from the Ocean.

In the following recommendations, the development of Ocean fishing and the protection and improvement of lagoon and reef resources will be treated in that order.

The Development of Ocean Fisheries

The Choice of Mechanized Craft for Ocean Fishing

In order to catch the additional 675 tons mentioned above, it is estimated that fishermen would be able to work 312 days a year, half of this time or 156 days being devoted to actual fishing. Therefore, the catch per fishing day must be about 9,700 lbs of fish. A 25' fishing boat powered with a 15 HP inboard engine could reasonably be expected to land an average of 300 lbs of fish per day of fishing.

On these premises, the fishing fleet should include 32 motor fishing boats. However, boats of this size require a safe anchorage and also sufficient passes through the reefs. Where there is no sheltered anchorage, or where the fishing craft must shoot the surf to come in, as often happens in Western Samoa, decked 20' canoes with a single outrigger, powered with a 10 HP outboard motor would provide a solution.

Such decked canoes could be expected to land an average 150 lbs of fish per actual fishing day, so that 64 canoes would be necessary to land the additional supply of fish.

For a 25' boat powered with a 15 HP diesel engine, putting to sea 200 days a year, average engine running time 6 hours per day at sea, the following table gives estimates of exploitation costs in Apia, the initial price of the boat being £2,500.

Depreciation (Boat and engine) spread over 5 years	£500. 0. 0.
Fuel oil	97.10. 0.
Lubricating oil	27.14. 2.
Fishing gear	300. 0. 0.
Maintenance	100. 0. 0.
Miscellaneous gear and spares	100. 0. 0.
Insurance	<u>250. 0. 0.</u>
Total:	<u>£1,375. 4. 2.</u>

The crew would include the owner-skipper and two men. The boat would be of wooden construction, equipped with a live-well, and would carry mast and sails as a safety measure.

Exploitation with 20' decked canoes would be based on the same number of days at sea, but with an average running time of five hours per day. The initial cost of the canoe is estimated at £300. 0.0., and the cost of two 10 HP outboard motors (one to be kept as a spare) would be £296. 0. 0. Exploitation costs over a period of one year would be approximately as follows:

Depreciation of canoe spread over 5 years	60. 0. 0.
Depreciation of outboard motor estimated life 2 years	74. 0. 0.
Petrol and oil mixture 1267 gals. of which 79 gals. oil	271. 9. 0.
Fishing gear	100. 0. 0.
Maintenance	25. 0. 0.
Miscellaneous gear and spares	<u>20. 0. 0.</u>
Total:	<u>£550. 9. 0.</u>

The crew of a canoe would include the one owner-skipper and one man.

Two Year Trial Plan

It would not be advisable to launch straight away a full scale campaign with a large number of boats or canoes. While all the estimates of catches and costs set out above are reasonable and probably even pessimistic to a certain extent, they must be verified in actual fishing operations.

The following trial plan has been designed on a scale consistent with the possibilities of the territory and, while its expected duration is two years, it is quite possible that the value of Ocean fishing with mechanized craft will be proved before that time has elapsed and, in that case, private initiative will most probably take over the further development of mechanized fishing. Two extremely important factors are likely to assist this development; the ready market existing for all types of fish and the availability of fish within easy reach of the islands.

In order to determine the most efficient fishing method, the following techniques should be tested;

1. Small scale longlining
2. Trolling
3. Handlining
4. Nylon trammel nets set as driftnets.

Staff

A staff of three would be sufficient to carry out this trial plan, it should include:

- (1) a Fisheries Officer
- (2) two Samoan Fisheries Assistants.

The Fisheries Officer would be directly responsible to the Director of Agriculture. He should be a young man (say between 30 and 40), and must have at least ten years experience of fishing and navigation with small mechanized craft in tropical waters. He must speak and write English well and be capable of organising and implementing the trial plan.

Buildings and shore facilities

A completely enclosed storage and work shed with a floor surface of at least 450 square feet should be made available in Apia.

Office space, furniture and equipment should be provided for the Fisheries Officer, preferably on the premises of the Department of Agriculture.

A vehicle will be needed from time to time and it is expected that the Department of Agriculture could make one available when necessary.

A freezing cabinet of approximately 20 cu.ft. should be provided for bait storage.

Boats

Two motorboats should be built in Apia according to the attached sketch plan. A detailed set of plans will be made available by the South Pacific Commission if required.

These 25' boats should be powered with diesel engines of about 15 HP. If available, aircooled engines should be given preference. Care should be taken to select a make and model for which spare parts can be obtained easily.

In addition, two fully decked 20' canoes should be built according to the attached sketch plan. These could be made of regular planking or of plywood. Metal rods should be used to attach the outrigger to the booms. Two hatches should be provided in the central part of the deck, between the outrigger booms, and fitted with two-piece hatch covers.

Gear

Longlines will be used for tuna, sharks, Spanish mackerel, marlin, sailfish etc.. 20 baskets will be used on each of the 25' boats, 5 baskets on each of the 20' canoes. Each basket is composed of a 10 to 15 fathoms buoy line, 120 fathoms of cotton or nylon mainline, 5 droplines each made of 5 fathoms nylon or cotton line, a swivel and one fathom of steel wire, with a hook $2\frac{1}{2}$ " to 3" across the bend. The buoys can be glass balls, empty 4 gallons drums, bamboo etc..

The mainline, buoy lines and droplines should have minimum breaking strain of 200 lbs, but the steel wire can be 150 lbs breaking strain.

Twenty-five fathoms of strong cotton line, a swivel and one fathom of steel or copper wire carrying a lure and hook will make a good trolling line. Six of these lines can be trolled from a 25' boat (two from bamboo outriggers on each side and two from the stern) while a canoe would only use three. Bonito fishing with pole and line, Samoan style, can be carried out from a boat or a canoe with two poles.

Fifty fathoms handlines can be procured locally. $\frac{1}{8}$ " cotton line would be suitable, $\frac{1}{12}$ " nylon can also be used. These lines should be fitted with one or more wire leaders and hooks, and a 2 to 3 lbs sinker.

Nylon trammel nets will have to be ordered from abroad. The inner net should be made of $\frac{1}{48}$ " twine, $\frac{21}{4}$ " stretched mesh, while the outer walls made of $\frac{1}{24}$ " twine would have a 16" mesh (stretched measurement). Each trammel net should be 120 feet long by 12 feet 6 inches deep. They should be mounted as drift-nets.

Six of these nets would be used on a 25' boat, two only on a 20' canoe. It is expected that good catches of Atule, flying fish and sharks can be made with these trammel nets. Ordinary drift-nets could be used for Atule and flying fish, if it were not for the abundance of sharks in the area, which makes it necessary to use trammel. The inner web of thin twine will catch the small fish, while the strong outer web will prevent the sharks from damaging the net and will also tangle them.

General Remarks

The two motor boats should be based in Apia, and the two canoes should operate from the North coast of Savai'i, in the Matautu Bay area.

The boats and canoes would be entrusted to selected local crews working under the supervision of the Fisheries Officer and his Assistants. These crews would be hired on a share basis, i.e., each crew would receive one-third of the proceeds of the sales of catches, after deduction of the costs of fuel and oil.

If it were decided, for budgetary considerations, to reduce the number of craft, it would be preferable to retain one pair, rather than one of each type. In this way, the craft would be able to lend each other support in case of engine trouble, for instance; also a better picture of the overall results could be obtained.

All catches should be carefully recorded, together with indications of gear used, fishing grounds, total hours at sea, and all expenditure.

Proceeds from the sale of fish caught could be used to reduce the running expenses, and the following estimative budget takes this possibility into account.

Tentative budget for the two-year trial plan

First year

Capital expenditure

Two 25' Motor boats	£5,000. 0. 0.	
Two 20' canoes and four 10 HP outboard engines	1,192 . 0. 0.	£6,192/0/0

Personnel

One Fisheries Officer (from overseas) salary	2,400. 0. 0.	
Fares and travel costs on appointment	300. 0. 0.	
Two Fisheries Assistants (local)	720. 0. 0.	
Local travel costs	100. 0. 0.	£3,520. 0.0.
	<u>o/f</u>	<u>£9,712. 0.0.</u>

b/f

£9,742. 0. 0.

Operating costs

Working expenses 25' boats	1,750. 0. 0.	
Crew shares, 25' boats	1,200. 0. 0.	
Working expenses 20' canoes	832. 0. 0.	
Crew shares, 20' canoes	800. 0. 0.	4,582. 0. 0.
		<hr/>
Total costs first year		£14,294. 0. 0.
LESS estimated proceeds from sales of fish.....		7,020. 0. 0.
		<hr/>
Net cost first year		7,274. 0. 0.

Second year

Personnel

Fisheries Officer	2,400 0. 0.	
Salary		
Fares and travel costs on repatriation	300. 0. 0.	
Two Fisheries Assistants	720. 0. 0.	
Local travel costs	100. 0. 0.	3,520. 0. 0.
		<hr/>

Operating costs

Working expenses 25' boats	1,750. 0. 0.	
Crew shares, 25' boats	1,200. 0. 0.	
Working expenses 20' canoes	832. 0. 0.	
Crew shares, 20' canoes	800. 0. 0.	4,582. 0. 0.
		<hr/>
Total costs second year		8,102. 0. 0.
LESS estimated proceeds from sale of fish		7,020. 0. 0.
		<hr/>
Net cost second year		1,082. 0. 0.

TOTAL First year 7,274. 0. 0.

Second year 1,082. 0. 0. 8,356. 0. 0.

LESS probable realisation on

sale of boats, canoes,

motors, etc...

3,000. 0. 0.

Estimated net cost of project
over two years

£5,356. 0. 0.

THE IMPROVEMENT AND PROTECTION OF REEF
AND LAGOON RESOURCES

Introduction of Trochus niloticus

The reefs around Upolu and Savai'i would provide a suitable environment for Trochus niloticus. Trochus shell still has some value as an export commodity, but the manufacture of curios from the polished shell would probably be more remunerative for Samoa. There is already a species of trochus in Samoa, Trochus obeliscus, but it is of much poorer quality than T. niloticus.

It would be advisable to introduce 1,000 trochus by air from Fiji, they should be packed in crates, between wet sacks. These trochus should be released on the reef North of the hydrodrome of Upolu, in a few feet of water. As they may be weakened by the time spent out of water, they should be placed base down on the rocks. Once satisfactory reproduction has been observed, 1,000 shells can be taken from Upolu to stock the Matamoana point area of Savai'i.

In order to obtain the best possible results from such an introduction the taking of shells should be prohibited for a period of two years within a radius of $\frac{1}{2}$ mile from the site of introduction.

In addition to its value as an export commodity or as raw material for curios, the animal is edible and would provide an additional food resource.

To prevent exhaustion of the stock, a minimum legal size of $3\frac{3}{4}$ " should be proclaimed when fishing begins. This size should be measured along the greatest diameter of the base of the shell.

Fisheries Legislation

At the present moment, there are no limitations on fishing other than those imposed by custom, such as the fishing rights of Manono Islanders and others mentioned earlier in this report. As a result, the reef and lagoon areas of Western Samoa are overfished and if action is not taken promptly to remedy this situation, it is most likely that fish production from these grounds will dwindle steadily and quickly, as the needs of the population increase.

Very elaborate regulations are generally less efficient and more difficult to enforce than simple ones. The Ordinance should give enforcement agents power to investigate fishing gear, i.e. all implements, movable or otherwise, used for fishing, and to impound such items of gear not conforming with regulations. They should also be empowered to take the owner of such prohibited gear, or any person found in possession of fish under the minimum legal size as defined in the regulations, to the nearest police station where the offender would be charged according to the normal legal procedure.

The regulations should prohibit entirely the use of explosive, and drugs of all types for fishing. Penalties for offences in this regard should be proportionally heavier than for other offences under the fishing regulations.

No limitations of mesh size or of intervals between consecutive slats, sticks, wires or rods should be set for nets and traps measuring not more than 1'4" in their greatest dimension.

Nets measuring more than 1'4" but not more than 5' in their greatest dimension should have a minimum mesh size of 1 $\frac{1}{4}$ " (the mesh being measured stretched on the wet net). All other nets should have a minimum mesh size of 1 $\frac{1}{2}$ ".

All traps measuring more than 1'4" in their greatest dimension should have a minimum interval of 3/4" between any two consecutive slats sticks, wires or rods. No fish trap of a permanent or semi-permanent nature should be erected or operated in any stream, river, estuary or outer reef channel. In addition, a minimum distance of 250 yards should be observed between any two traps, and no net fishing should be allowed within 50 yards, of any trap measuring more than 10' in its greatest dimension.

As indicated earlier, minimum sizes should be established for the most common types of lagoon and reef fish. Such measurements are taken from tip of snout to the nearest point on the edge of the tail fin, the fish being laid flat.

The following table gives a series of suggested minimum sizes:

<u>Common name of fish</u>	<u>Family</u>	<u>Min. size in inches</u>
Grey mullet	Mugilidae	8
Goat fish	Mullidae	6
Parrot fish	Scaridae	8
Groupers	Serranidae	10
Pigfaced breems	Lethrinidae	10
Rabbit fish	Siganidae	8
Snappers	Lutjanidae	10
Soldier fish	Holocentridae	5
Butterfly fish	Chaetodontidae	5
Moray eels	Muraenidae	12

Undersized fish should be released immediately. Possession of undersized fish should be made an offence. Exceptions to this rule and to the rule on the use of drugs for fishing might be made for scientific purposes only, with a special authorisation and under official supervision.

H. VAN PEL

October 1960

A LIST OF FISHES AND OTHER MARINE PRODUCTS
OF IMPORTANCE IN WESTERN SAMOA

Fishes

<u>Vernacular</u>	<u>English</u>	<u>Scientific</u>
Aa	Waigeu snapper	Lutjanus vaigiensis, Q. & G.
Afa	Blue tail mullet	Valamugil Buchanan, Bl.
Afulu	Goatfish	Mullidae
Ali	Flounder	Pleuronectidae
Anae	Bonito	Katsuwonus pelamis, Linn.
Atule	Scad	Selar crumenophthalmus, Bloch
Aua	Garfish	Belonidae
Ava	Milkfish	Chanos chanos, Forsk
Ava'ava moana	Banded sweetlip	Plectorhynchidae
Fai	Ray	Trygonidae
Filoa	Pigface bream	Lethrinidae
Fuga	Parrotfish	Scaridae
Gaogo	Yellowfin tuna	Neothunnus macropterus, schl.
Gatala	Grouper	Serranidae
Lai	Leatherskin	Carangidae
Lalafutu	Baillon's dart	Trachinotus Bailloni, Lac.
Laulaufau	Batfish	Platacidae
Lo	Spinefoot	Siganidae
Malie	Shark	General name
Malau	Soldier fish	Holocentridae
Malauli	Trevally	Carangidae
Malolo	Flying fish	Exocoetidae
Masimasi	Dolphin fish	Coryphaena hippurus, Linn.

<u>Vernacular</u>	<u>English</u>	<u>Scientific</u>
Mata-i-taliga	Hammerhead shark	Sphyrnidae
Moamoa	Bod fish	Ostraciontidae
Nanue	Silver bream	Sparidae
Palagi	Surgeon fish	Acanthuridae
Palaia	Spanish mackerel	Cybiidae
Pelupelu	Sardine	Clupeidae
Pusi	Moray eel	Muraenidae
Sali	Hardyhead	Allanetta Forskali, Ruppell
Sapatu	Barracuda	Sphyraenidae
Saula	Sail & Spearfish	Istiophoridae
Sue	Blow fish	Tetraodontidae
Sugale	Wrasse	Labridae
Suila	Half beak	Hemirhamphidae
Sumu	Leather jacket	Aluteridae
Tautu	Porcupine fish	Diodontidae
Tifitifi	Butterfly fish	Chaetodontidae
Tu'uu	Angel fish	Pomacanthidae
Ume	Unicorn fish	Acanthuridae

Miscellaneous

Faisua	Giant clam	Tridacnidae
Fe'e	Octopus	Octopus sp.
Laumei	Green turtle	Chelonia mydas
Laumei uga	Hawksbill turtle	Chelonia imbricata
Manue	Porpoise	Cetacea
Pa'a	Crab	General name
Sea	Beche de mer	Holothuroidea
Tafola	Whale	Cetacea
Tuitui	Sea urchin	Echinoidae
Ula sami	Spiny lobster	Panulirus sp.

Note: Vernacular names often vary according to the size of the fish.

SKETCH PLAN 20' DECKED FISHING CANOE

Scale 1/50

- A-B Midsection
- C Outrigger float
- D Outboard motor
- E Two-piece hatch-cover
- F Pole support
- G Butt blocks
- H Outrigger booms



