



GOVERNMENT OF WESTERN SAMOA

PRAWN DEVELOPMENT PROJECT

REQUEST FOR FOREIGN AID

DEPARTMENT OF ECONOMIC DEVELOPMENT
AUGUST 1976.

INTRODUCTION

The Western Samoa Government is most anxious to launch a number of projects that will further diversify the economic base of the country. There is a need to develop resources other than copra, cocoa and bananas. Imports have climbed steeply in recent years and ways are being sought to reduce these imports through import substitution or to pay for the imports by earning more foreign exchange. Additionally there is a growing number of trained and educated Samoans who are searching for new employment opportunities other than traditional plantation work. Prawns are a source of protein and protein foods are needed to improve the diet of the Samoan people.

The prawn project fits the above needs by being an export industry with import substitution potential. Employment will be created for up to 8 Samoans directly on the project and others in the private sector. And prawns will help increase the nutritional content of the Samoan diet.

The Government of Western Samoa needs assistance to establish a prawn industry. The hatchery technique is a complicated technique, that requires substantial knowledge, experience, capital, plant and equipment. This expertise is very expensive to acquire as are the equipment and vehicles that must be imported.

In this proposal all prices unless otherwise stated are in Samoan tala. The tala is currently roughly equivalent to the Australian dollar.

CHAPTER I. DESCRIPTION OF THE PROJECT

1.1 The experimental freshwater prawn culture project is basically an attempt to initiate the production of export quality prawns by Samoans. As the species, macrobrachium rosenbergii, has qualities which appear acceptable to the export markets and could be raised in Samoa on a commercial basis, it has been selected for the project. The project will be divided into two phases.

1.2 Phase I will consist of:

- (a) determining and earmarking the amount of suitable land for prawn farms;
- (b) development of two acres of experimental prawn farms;
- (c) importing juvenile prawns and raising them to marketable size;
- (d) experimental culturing of fish with prawns for the local market;
- (e) conducting marketing tests of prawns;
- (f) preliminary appraisal of project.

1.3 If the appraisal of Phase I is positive, the project will carry on into Phase II which will consist of:

- (a) surveying and selecting a suitable hatchery site;
- (b) construction of a hatchery;
- (c) development of 8 additional acres of ponds on land of private individuals or villages;
- (d) breeding prawns, in the hatchery, for the 10 acres of prawn farms (2 acres government and 8 acres private);

- (e) raising prawns to marketable size;
- (f) continued experimental culturing of fish for the local market;
- (g) establishment of marketing facilities for exporting prawns;
- (h) developing export markets for prawns.

1.4 The primary objective of the prawn culture is to increase exports and strengthen monetary reserves. Imports have climbed steeply in recent while exports have remained stagnant and the result has been a steadily growing trade deficit. In 1975 imports were \$18.9 million and exports \$5.6 million and the trade deficit was \$13.3 million. Western Samoa has also had difficulties maintaining reserves. The country devalued its currency in late 1975 and earlier had used IMF resources to bolster its reserves. There is therefore an urgent need to develop export-oriented industries as well as import - substitutive industries.

1.5 Despite considerable inputs from the Department of Agriculture, agricultural exports of our traditional crops have fallen. Copra exports have fared the best because quantity exported has not decreased and has remained steady. Cocoa exports are less than half the quantity exported 15 years ago. Bananas exports have performed the worst of the traditional crops and is only a small fraction of what was exported in the 1958-65 period. Timber exports in 1975 are a third of the average quantity exported in 1972-74. This all points to a need to develop further exports outside of our traditional exports.

1.6 There is some scope for import substitution. Imports of fish and fish preparations have been around 5% of all imports in the recent past. In 1974 Western Samoa imported \$978,000 of fish products which is 6% of all imports and nearly 20 per cent of all food imports. Hotels will purchase prawns and there are five major hotels in Western Samoa and one under

construction. Tourism will continue to increase and additional hotels will be constructed. Local people can also be expected to consume local prawns as opposed to purchasing the costly imported fish and meats.

1.7 Another strong objective of the prawn project is to increase employment opportunities. Unemployment has not been much of a problem in the recent past as many Samoan were able to obtain employment overseas, mainly in New Zealand. Now that New Zealand is curtailing immigration, Western Samoa could be faced with a serious unemployment problem in coming years. Regardless of the immigration policies of New Zealand, there is a continuing need to develop opportunities in Samoa so that our skilled and educated people don't want to leave.

1.8 If prawn culture were successful in Western Samoa, it would make use of the marginal agricultural land situated near permanent flowing streams. These semi-marshy areas are difficult and expensive to develop and must produce a crop that will justify the initial outlay of capital. As the possible agricultural crops which could be cultured on the land are low in value, a high priced commodity like prawns would make the best use of these marginal lands. In addition, the production of fish will be experimented with and could lead to even more utilisation of these marginal lands.

CHAPTER II. THE MARKET

2.1 The high price of prawns justifies air freighting of this product. Both the regional market involving neighbouring island nations and the large markets of the developed countries are potential outlets for frozen prawns.

2.2 During Phase I, the domestic market should be exploited first and then the regional market. Direct flights are available to American Samoa, Tonga, Fiji and Nauru. Transshipment of air cargo through American Samoa would allow access to the West Coast U.S.A. and New Zealand.

2.3 Marketing trials will be carried out in Phase I as well as more research into potential markets. Japan and the United States are the largest importers of shrimp and prawns. The U.S. allows duty-free imports of shrimp in fresh or frozen form. Canada has a 25% General tariff but MFN and British Preferential rates allow duty-free imports. Fresh shrimp into Japan are 10% for General Tariff and 5% GATT tariff.

2.4 In 1973 the U.S. imported around US\$275 million in prawns; the major suppliers were Mexico and India and other Latin American countries. Japan in 1973 imported US\$328 million in prawns and lobsters; the major suppliers were India, Mexico, Australia, Thailand and China. Distance from suppliers to buyers does not appear to be much of a problem, as exemplified India supplying the United States and Mexico supplying Japan.

2.5 Apart from lobster, prawns and shrimp have no real rivals and both lobster and shrimp are scarce in relation to demand. Prices of shrimp (ex-vessel) have steadily risen from US\$.50 per pound in 1963 to \$1.53 in 1973 and prices were over \$2 per pound in 1974.

CHAPTER III. PROJECT ENGINEERING

3.1 Species of the fresh water shrimp genus, Macrobrachium, are a tasty and valuable source of protein occurring naturally throughout South East Asia and the South Pacific. Macrobrachium rosenbergii has been cultured in South East Asia, using primitive methods, for thousands of years, and more recently in places such as Hawaii and Tahiti, using modern technology. More primitive culture techniques involve the capture of wild stock, juveniles and adults; retaining them in ponds, or other enclosures; feeding them; and finally harvesting them. Modern techniques involve laboratory hatching of eggs and rearing of larvae. This project employs the modern techniques with importation of juvenile from Hawaii or elsewhere. Experimental culturing of the indigenous species, Macrobrachium lar, has not brought successful results and this species will not be used in the project.

3.2 The sites for the project have not been determined and one of the first activities of the project is to survey potential prawn pond areas. An initial 2 acres will be selected for Phase I and additional 8 acres will be selected for Phase II.

3.3 The services of a prawn specialist could be used for two months to conduct a survey of available prawn pond land and to select a suitable hatchery site. A fisheries biologist would be needed for the duration of both phases to provide needed professional support. A pond construction engineer will be needed for three months in Phase I and three months in Phase II to assist in the supervision of this excavation of the initial 10 acres of ponds. As the land suitable for prawn ponds is likely to be marshy, or near permanent streams, an experienced engineer is very essential to design and at least supervise the initial construction stages of the ponds.

3.4 The following equipment is needed: (1) three 3/3 inch diesel water pumps for supplying fresh and salt water to the hatchery; (2) two large air

compressors for giving aeration to the hatchery; (3) three 2" portable water pumps for general use on experimental ponds; (4) one generator for supplying laboratory equipment; (5) miscellaneous laboratory equipment; (6) one refrigerated truck; (7) an ice making plant; (8) cold storage facilities and (9) one pick-up truck for general transport requirements of the project. Almost all of the above equipment and vehicles will need to be imported, involving heavy foreign exchange expenditures.

3.5 Buildings needed are a laboratory, storeroom and a processing shed. In addition a number of cement tanks will need to be constructed including prawning tanks, rearing tanks, water reservoirs, and a green water tank.

CHAPTER IV. OPERATIONAL PLAN

4.1 If the juvenile prawns are brought in from Hawaii, the timing of the project would need to be set in regards to the seasonal availability of the prawn larvae. One suggested timing outline is given below:

4.2 Phase I

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| <u>Year 0 June</u> | A. Quotation for pick-up truck made and urgent delivery requested. |
| | B. Biologist for supporting Samoan fisheries officer arrives on site. |
| | C. Qualified prawn pond consultant and engineer begin survey of potential prawn pond land. When total land available for ponds is determined a site for the 2 acres of experimental ponds is selected and designed. |
| <u>Year 0 August</u> | D. Pond consultant temporarily finishes; engineer supervises construction of two acres of ponds and a green water cement tank. |
| <u>Year 0 Sept.</u> | E. Engineer temporarily finishes. |
| <u>Year 0 April</u> | F. Pond construction completed with grass to stabilise walls, etc. |
| <u>Year 1 June</u> | G. Ponds are filled, fertilised and ready for first juvenile prawns. Holding tank is complete; one small air compressor and one portable water pump are on hand. |
| <u>Year 1 July</u> | H. Prawn juveniles arrive and are stocked into ponds. Experiments with prawn and fish begin. |
| <u>Year 1 May</u> | I. Prawns are harvested; market trials with local hotels and regional markets. |

Year 2 June J. Market trials complete and preliminary analysis of project made.

If favourable results are given from the project analysis Phase II would begin.

4.3 Phase II

Year 2 July A. Prawn consultant and engineer begins survey for hatchery sites; eight acres of additional ponds on private land are designed. Second lot of juvenile prawns imported for 2 acres of experimental ponds. Second experiment with prawns (and fish) begins.

Year 2 August B. Quotes for hatchery equipment placed. Hatchery and eight acres of ponds constructed under supervision of engineer. Hatchery consultant returns.

Year 2 October C. Engineer finishes.

Year 2 May D. Market second crop of prawns now harvested. Quotes for cold storage facilities requested; these storage facilities are constructed when bids are complete.

Year 3 July E. Third lot of imported juvenile for experimentation in 2 acres of ponds. Third experiment begins involving prawns and fish.

Year 3 May F. Third lot of imported juvenile prawns harvested and undergo marketing trials. Cold storage facilities arrive and installation begins. Hatchery and eight acres of ponds complete.

Year 4 July G. Hatchery produces first prawn larvae for 10 acres of ponds (2 government and 8 private).

Year 5 May H. Prawns harvested from 10 acres of ponds undergo marketing trials with new plant and facilities. Final analysis of the project is made. Biologist finishes.

CHAPTER V. INVESTMENT

5.1 Phase I. Capital and operating costs:

Site development		\$ 3,000
Pick-up truck		3,000
Equipment		3,500
Imported Juveniles		500
Recurrent expenses (for 2 years)		12,000
labour	\$ 6,500	
transportation	2,000	
office	1,500	
other	2,000	
Total Phase I		<u>\$22,000</u>

5.2 In addition, foreign expertise in Phase I will be needed as follows: (experts are costed at \$24,000 per year)

(1)	one prawn specialist	2 months	\$ 4,000
(2)	one biologist	24 months	48,000
(3)	one engineer	3 months	6,000
	Total cost of foreign expertise Phase I		<u>\$58,000</u>

5.3 Phase II. Capital and operating costs:

Site development		\$12,000
Buildings and tanks		82,000
laboratory/processing/ storage	8,000	
5 ton ice plant and chiller	70,000 ^{1/}	
Tanks	5,000	
Refrigerated truck		15,000

^{1/} includes maintenance contract.

Equipment		\$ 62,000
hatchery	35,000	
pond	10,000	
laboratory	13,000	
cold storage	2,000	
office	2,000	
Imported Juveniles		1,000
Recurrent expenses (for three years)		94,000
labour	40,000	
transportation	7,000	
plant and facilities	25,000	
food and fertilizers	9,000	
office	5,000	
other	8,000	
Total Phase II		<u>\$266,000</u>

5.4 In addition foreign expertise in Phase II will be needed as follows:

(1)	one prawn specialist	2 months	\$ 4,000
(2)	one biologist	36 months	72,000
(3)	one engineer	3 months	6,000

Total cost foreign expertise Phase II \$ 82,000

5.5 A summary of capital and operating and foreign expertise costs is: -----

Phase I

Capital and operating costs	\$ 22,000
Foreign expertise	<u>58,000</u>
Total Investment Phase I	\$ 80,000

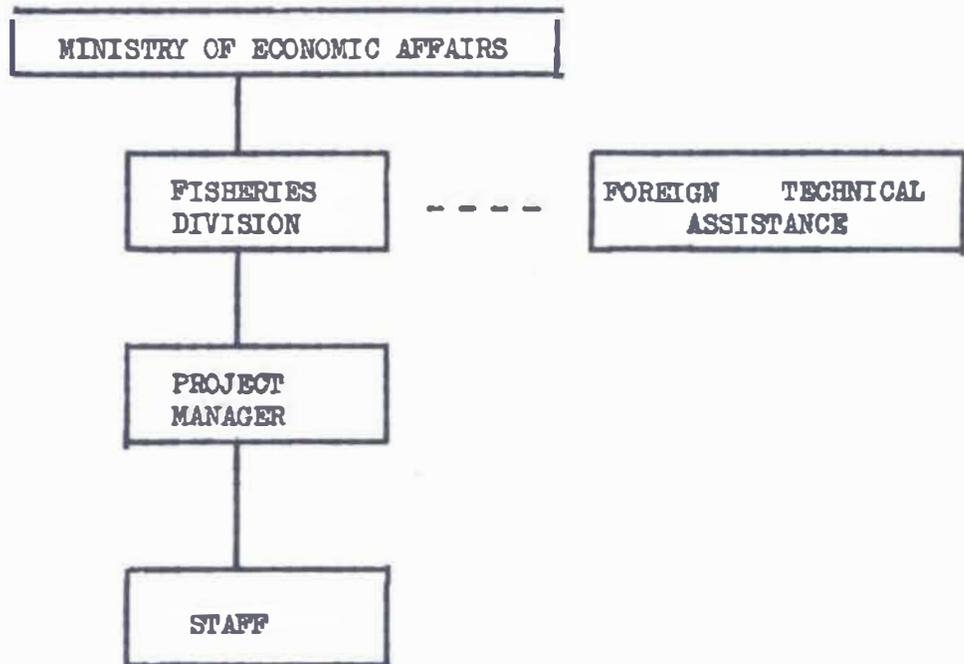
Phase II

Capital and operating costs	\$266,000
Foreign expertise	<u>82,000</u>
	\$348,000

5.6 No projections of production and revenues have been made for lack of sufficient information. Therefore yearly revenues and expenditures are not given. The project itself will generate the information on production yields of both the hatchery and the ponds and this will be combined at the end of Phase I with better information on markets, prices and transportation costs into an economic feasibility study and preliminary analysis of the project.

CHAPTER VII. ORGANISATION

7.1 The Fisheries Division under the Ministry of Economic Affairs will have overall responsibility for the project. The organisational set up will therefore be:



7.2 The staff would consist of only one semi-skilled labourer in Phase I. During Phase II it is envisioned that staff will encompass 3 college graduates working in prawn culturing, 1 college graduate to handle marketing affairs, 1 mechanic, and three semi-skilled labourers.