

PC-AAZ-699

ISN 62331

PROJECT PAPER

PACIFIC ISLANDS

MARINE RESOURCES

(879-0020)

REGIONAL DEVELOPMENT OFFICE/SOUTH PACIFIC

SUVA, FIJI

AUGUST 15, 1989

PD-AAZ-699

AGENCY FOR INTERNATIONAL DEVELOPMENT PROJECT DATA SHEET		1 TRANSACTION CODE <input type="checkbox"/> A = Add <input type="checkbox"/> C = Change <input type="checkbox"/> D = Delete	Amendment Number	DOCUMENT CODE 3
2 COUNTRY/ENTITY Regional Development Office/ South Pacific		3 PROJECT NUMBER 879-0020		
4 BUREAU/OFFICE ANE		5 PROJECT TITLE (maximum 40 characters) Pacific Island Marine Resources		
6 PROJECT ASSISTANCE COMPLETION DATE (PACD) MM DD YY 9 3 0 9 4		7 ESTIMATED DATE OF OBLIGATION (Under B below enter 1, 2, 3, or 4) A. Initial FY 89 B. Quarter 4 C. Final FY 94		

8 COSTS (\$000 OR EQUIVALENT \$1 =)

A. FUNDING SOURCE	FIRST FY 89			LIFE OF PROJECT		
	B FX	C L/C	D Total	E. FX	F L/C	G Total
AID Appropriated Total						
(Grant)	(1,000)	()	(1,000)	(9,214)	(3,286)	(12,500)
(Loan)	()	()	()	()	()	()
Other						
US 1						
US 2					5,409	5,409
Host Country						
Other Donor(s)						
TOTALS	1,000		1,000	9,214	8,695	17,909

9 SCHEDULE OF AID FUNDING (\$000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	C. PRIMARY TECH. CODE		D. OBLIGATIONS TO DATE		E. AMOUNT APPROVED THIS ACTION		F. LIFE OF PROJECT	
		1 Grant	2 Loan	1 Grant	2 Loan	1 Grant	2 Loan	1 Grant	2 Loan
(1) RDN	252	077				12,500		12,500	
(2)									
(3)									
(4)									
TOTALS									

10 SECONDARY TECHNICAL CODES (maximum 6 codes of 3 positions each) 099 059 097 241				11 SECONDARY PURPOSE CODE			
12 SPECIAL CONCERNS CODES (maximum 7 codes of 4 positions each)							
A. Code	BR	ENV	TECH	PVOU	R/AG		
B. Amount	all	80%	80%	35%	80%		

13 PROJECT PURPOSE (maximum 480 characters)

To develop, demonstrate and make available for replication innovative technologies and strategies which increase the benefits to Pacific Island communities from sustainable small-scale private sector uses of marine resources

14 SCHEDULED EVALUATIONS				15 SOURCE/ORIGIN OF GOODS AND SERVICES			
Interim	MM YY	MM YY	Final	MM YY	<input checked="" type="checkbox"/> 000 <input type="checkbox"/> 941 <input checked="" type="checkbox"/> Local <input type="checkbox"/> Other (Specify)		
	4 9 2			8 9 4			

16 AMENDMENTS/NATURE OF CHANGE PROPOSED (This is page 1 of a _____ page PP Amendment)

17 APPROVED BY	Signature <i>John B. Woods</i>	18. DATE DOCUMENT RECEIVED IN AID/W OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY
	Title Regional Director	
	Date Signed MM DD YY 8 16 89	

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Bureau's emerging Environment/Natural Resources strategy by addressing important environmental problems associated with marine resources. We asked that (i) the final design reduce dependence on government services such as transportation, and that (ii) PIMAR support subactivities which will be sustainable after our assistance ends. In response, the PP substitutes private chartered transport for AID-financed government transport proposed in the PID. PP analyses establish that PIMAR activities will be sustained by the economic and financial viability of private enterprises engaged in mariculture and fishing. However, these analyses are necessarily based on a number of assumptions, and we suggest that the mid-term PP evaluation verify the viability of private investments assisted by PIMAR. The proposed guidance cable (Tab B) includes these points:

The Bureau Environmental Coordinator indicated that the Cook Islands subproject should require an Environmental Assessment before funds are obligated for construction. The guidance cable reflects this requirement.

Foreign Assistance Act Section 620(o) requires that we consider denying aid to countries which seize or penalize U.S. fishing vessels operating in international waters. Kiribati, Solomon Islands, and Papua New Guinea--potential beneficiaries of this project--seized U.S. fishing vessels before the 1988 tuna treaty. The Administrator has considered these cases and determined that aid should not be withheld.

Congressional Status: This project was presented in the FY 1990 Congressional Presentation, but a separate Congressional Notification (CN) was required because it is a new project. A CN was submitted October 27, 1989 and expired without objection November 11, 1989.

Recommendations:

- A. That you authorize the PIMAR Project by signing the attached Project Authorization (Tab A), and
- B. That you sign the guidance cable (Tab B).

Attachments:

- A. Project Authorization
- B. Guidance cable
- C. PP

4. Source and Origin of Commodities, Nationality of Services

Commodities financed by A.I.D under the project shall have their source and origin in the cooperating countries or in the United States, except as A.I D. may otherwise agree in writing. Except for ocean shipping, the suppliers of commodities or services shall have the cooperating countries or the United States as their place of nationality, except as A I D. may otherwise agree in writing. Ocean shipping financed by A.I D under the project, except as A.I D may otherwise agree in writing, shall be financed only on flag vessels of the United States.



Barbara Turner
Acting Assistant Administrator
Bureau for Asia, Near East
and Europe

Date: 7/13/90

39120

Clearances:

A/DAA/ANE DMerrill	
ANE/TR BTurner	<i>R Blue</i>
ANE/DP PDavis	Draft
ANE/EA JATennant	<i>Y</i>
GC/ANE JSilverstone	Draft
ANE/PSDS LMarston	Draft
S&T/AGR:LTrott	Draft
ANE/TR/ARD JSwallow	Draft
ANE/TR/HR SGrant	Info
ANE/PD/ENV MKux	Draft
ANE/PD/EA EMorris	<i>em 6/24/90</i>

cc: File 879-0020; JN chron
RDO/SP, Suva
RLA, Jakarta

ANE/PD/EA TR *TR* 1:6/19/90 WD 38970

PROJECT SUMMARY

RATIONALE

The resources of the world's oceans are becoming fully exploited and the quality of inshore waters suitable for the expansion of artisanal fisheries is increasingly under pressure from coastal development activities. The underutilized marine resources and clean productive nearshore waters of the islands of the South Pacific provide the most important opportunity for economic development. The Pacific Island Marine Resources Project will assist the island communities to take advantage of opportunities to increase their economic returns from the sea around them by testing and making available new technologies and strategies for expanding sustainable small-scale private sector marine resource activities.

The approach supported by the project is to encourage small-scale commercial fishing activities to exploit underutilized resources further offshore, conserving the resources of the shallower waters of the lagoons and reefs for more subsistence oriented uses and mariculture. At the same time, the project will assist island nations to acquire better knowledge about their marine resources and how to manage them so that the resources, and the opportunities for development that they sustain, will not be depleted by over-exploitation or degradation of the marine environment.

PROJECT ELEMENTS

The project will have five country components individually targeted at generating sustainable economic gains for the participating communities, but also selected as providing models that can be applied elsewhere in the region. A sixth regional impact component will provide support for regional organizations and PVOs to disseminate project results regionally and extend the project's activities to other countries in the region.

COUNTRY COMPONENTS

The project will

- (1) in Cook Islands, provide pearl oyster specialists, materials and equipment for a research, extension and training facility to establish a black pearl industry,
- (2) in Kiribati, provide a series of short-term technical assistance for a program of applied marine resources research to devise strategies for better use of the marine resources of the densely populated Tarawa atoll and to protect the atoll marine ecosystem
- (3) in Papua New Guinea, provide fishing and fish marketing specialists to assist coastal village fishing communities to increase catches by adapting new fishing methods and to improve fish handling and marketing to meet the growing demand for fish in three secondary population centers
- (4) in Tonga provide fishing and fish marketing technical assistance, and chartered trial fishing vessels to adapt small-scale tuna longlining techniques for use on small offshore vessels that are technically and financially within the reach of Pacific Island fishermen, and
- (5) in Tuvalu, provide a chartered survey vessel and scientific and fishing specialists to assess deep bottomfish resources and establish small-scale offshore deep bottomfishing operations,

IMPLEMENTATION

The country components of the project will be obligated by bilateral agreements with each cooperating government, Cook Islands, Kiribati, Papua New Guinea, Tonga and Tuvalu. These components will be implemented through three mechanisms, a cooperative agreement for Kiribati, a cooperative agreement for Papua New Guinea, and a contract for Cook Islands, Tonga and Tuvalu.

The project will be managed from RDO/SP by two project-funded PSCs, one will be overall project coordinator and the other will manage the regional impact component.

The proposed project budget is as follows

Summary Budget of A I D Costs	
(\$000)	
Technical Assistance	\$7,525
Training	486
Charter vessels/Transport Services	928
Commodities/Construction	993
Evaluation/Audit/Coordination	832
Other	<u>350</u>
Sub-Total	11,114
Contingencies/Inflation	<u>1,386</u>
Total	\$12,500 =====

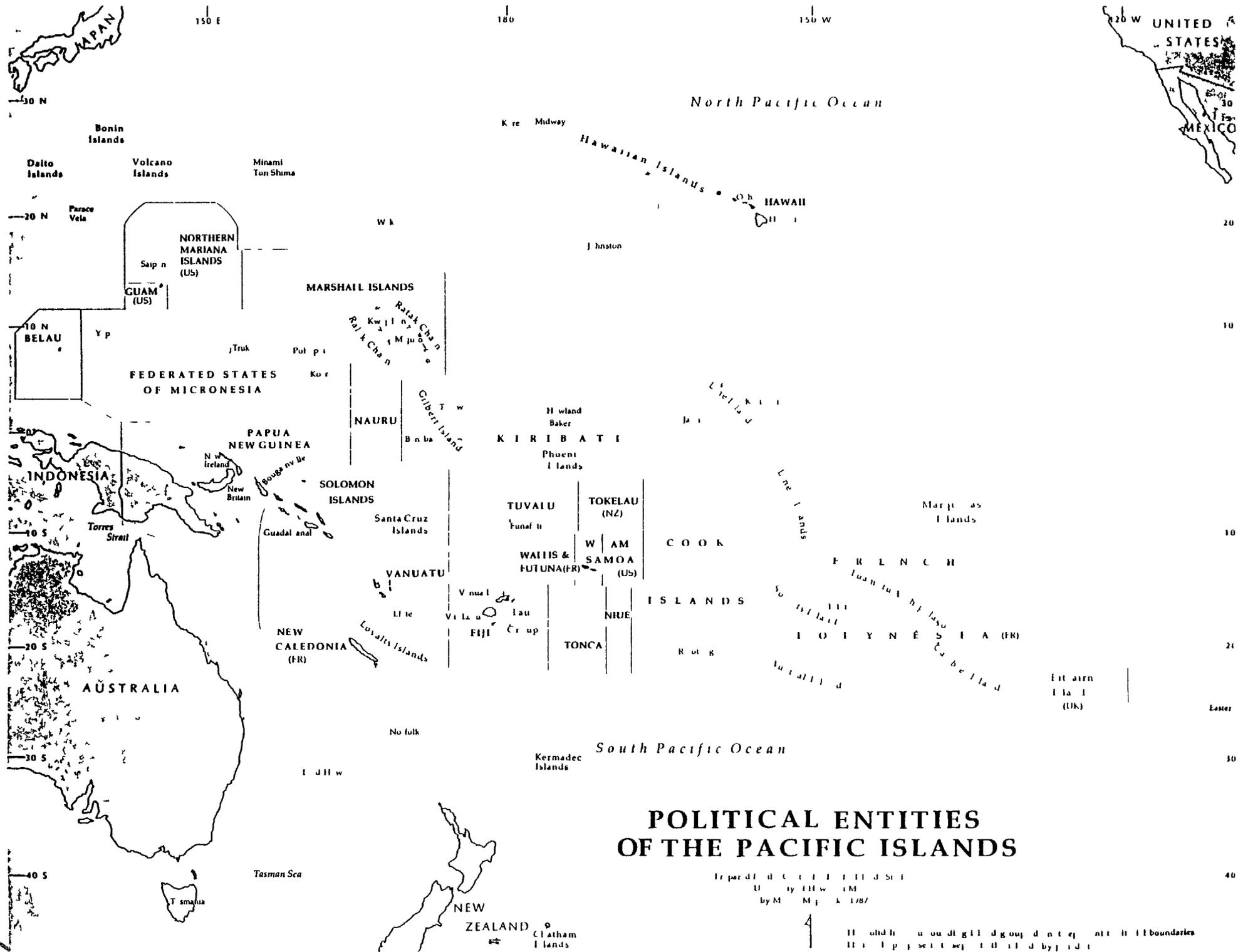
111(b)

12

LIST OF ACRONYMS

ADO	Agricultural Development Officer or Agriculture and Rural Development Office
A I D	Agency for International Development
AIDAB	Australian International Development and Assistance Bureau
ARDU	Atoll Research Development Unit (of USP)
BDDP	British Development Division in the Pacific
CBD	Commerce Business Daily
CI	Cook Islands
DFMR	Department of Fisheries and Marine Resources (PNG)
DFZ	Declared Fishing Zone
EEZ	Exclusive Economic Zone
EOP	End of project
EOPS	End of project status
ESF	Economic Support Funds
FAD	Fish aggregating device
FAO	Food and Agriculture Organization (of the U N)
FFA	Forum Fisheries Agency
FRLC	Federal Reserve Letter of Credit
FSP	Foundation for the Peoples of the South Pacific
FX	Foreign Exchange
GDP	Gross domestic product
GOCI	Government of the Cook Islands
GOK	Government of Kiribati
GPNG	Government of Papua New Guinea
GOT	Government of Tonga, or Government of Tuvalu (depending on location in text)
IRR	Internal rate of return
JICA	Japanese International Cooperation Agency
LC	Local Currency
LDC	Lesser Developed Country
LOP	Life of project
MAF	Ministry of Agriculture and Fisheries
MIS	Management Information System
MMR	Ministry of Marine Resources (Cook Islands)
MMT	Million metric tons
MNRD	Ministry of Natural Resource Development (Kiribati)
MPN	Most probable number (coliform bacterial)
MSY	Maximum sustainable yield
M\T	Metric ton
NM	Nautical mile
NMFS	National Marine Fisheries Service (of NOAA)
NOAA	National Oceanic and Atmospheric Administration

NRM	Natural Resources Ministry
NZ	New Zealand
PACD	Project Assistance Completion Date
PP	Project Paper
PID	Project Identification Document
PIMRIS	Pacific Islands Marine Resources Information System
PIO/P	Project Implementation Order/Participants
PNG	Papua New Guinea
PSC	Personal services contractor
PVO	Private voluntary organization
RDO/SP	Regional Development Office/South Pacific
RDSS	Regional Development Strategy Statement
ROI	Return on investment
SPC	South Pacific Commission
TDY	Temporary Duty
UN	United Nations
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Programme
URI	University of Rhode Island
USDH	U S direct hire
USP	University of the South Pacific



I PROJECT RATIONALE AND DETAILED DESCRIPTION

A Background

The national economic development plans for the Pacific Island nations are driven by two major factors

(1) the need to provide income earning opportunities for the rapidly growing numbers of young people aspiring to cash incomes, and

(2) concern over unbalanced growth which has created in many Pacific Island states a small, growing modern sector, but stagnation in economic returns to traditional rural activities

Island communities look to the resources of the sea to solve these problems. The pursuit of greater economic gains from marine resources is a feature of the development plans of all ten nations which A I D assists in the South Pacific region. For some of these, such as Kiribati and Tuvalu, the resources in their waters now represent the only prospect for economic growth. Even for those with larger land masses and richer land resources, marine resource development is a central priority.

Most Pacific Island nations have become independent since the 1970s. Their colonial administrations, centered on land-based activities, paid relatively little attention to developing or conserving marine resources. In addition, pre-independence fisheries programs concentrated heavily on modern industrial-scale tuna catching and processing, with little attention paid to traditional small-scale fisheries activities.

Now, Pacific Island countries are systematically pursuing marine resources development and management. They are expanding and strengthening their marine resources administrations, allocating more of their own resources and those available from donor assistance towards marine resource development, and paying more attention to issues such as domestic fish marketing, inshore sea use rights, marine resource conservation and the impact of pollution on the marine environment.

Pacific Island nations also give high priority to the development of small-scale fisheries which has the potential to touch the lives of almost all their populations. The small-scale marine resources development programs adopted by these communities reflect their physical, social and economic diversity. But there are some strong common strategic elements. These include

(1) encouraging the progressive development of small-scale commercial fishing to move beyond the reef to utilize under-exploited resources in the deeper waters, while preserving inshore resources for subsistence purposes,

(2) protecting the coastal marine environment from damage, especially from land-based activities

(3) establishing research-based marine resource management regimes to protect both inshore and offshore resources over time and ensure economic viability of newly developed fisheries

B. Relationship to Regional Development Strategy Statement (RDSS) and Management Action Plan

The approved South Pacific RDSS has as its goal increasing income opportunities for men and women through means which enhance the conservation and management of natural resources. The RDSS outlines a marine resources program which is a central part of A I D.'s regional strategy for pursuing that goal.

The strategy identifies opportunities to increase incomes in the traditional economic sectors and among the growing rural and outer island populations. A better mobilized private sector which concentrates on markets and trade in higher value agro-marine products can make a major contribution. Growing local demand for marine products coupled with the potential for significant export earnings promise real opportunities to expand employment and cash income through increased and better managed private investment.

The regional program focuses on increasing income opportunities for men and women in the traditional sectors of agriculture and marine resource utilization. This will be given a longer-term perspective in communities where ill health, undesired population growth and environmental degradation present real and treatable obstacles to achieving income growth. The new strategy calls for new mechanisms of assistance delivery and new approaches to program development.

- Targeted assistance within regional projects will meet needs of specific countries while contributing to the range of expertise and experience available to the region through regional institutional dissemination mechanisms. Each regional project will therefore have country specific components which focus on the comparative advantage of a particular strategy for a sector and test or demonstrate approaches which could have application elsewhere in the region.
- Technologies and methods developed through these projects are made available through regional institutions and PVOs to all the countries in the region.
- PVOs are used as intermediaries in certain countries where they have a history of effective programs and tangible results and/or in fields of expertise where they have developed specialized technical knowledge on how to reach and work with the beneficiary populations.
- Careful attention is paid to program successes and failures through a comprehensive monitoring system which allows for timely adjustment of projects and responds to opportunities which arise in the region.

The Pacific Islands Marine Resources project (879-0020) incorporates each of these approaches in its design and emphasizes private sector development, natural resource management and sustainability as key strategies in its evolution.

Although regional in scope, the project has carefully targeted components for each of its participating host governments: Cook Islands, Papua New Guinea, Kiribati, Tonga and Tuvalu. In each case an activity has been selected which meets national needs for marine resource development as well as offers potential replication in other countries in the region.

The technologies and methods developed and tested in this project will be disseminated through regional institutions to other countries in the South Pacific who are ready to test the technological package (See Annex F, Regional Component Description)

Where appropriate, PVOs will be used as developers and disseminators of the research and results either through direct participation in the country components or through regional workshops and publications

The monitoring system designed for this project takes into account both its pilot nature and its regional application potential. Extensive development of baseline data on targeted fisheries permits greater comparison of progress within countries and between countries over time. The project therefore allows for targeted start-up activities which have been carefully examined in pre-design feasibility studies to identify potential key activities for each component. Where design issues or potential outcomes of interventions are less clear (as in Papua New Guinea and Kiribati) the project component itself allows for start-up planning and objective setting work which will fill in design uncertainties as information in-country becomes available over time.

The project is primarily oriented toward development of fisheries technologies and methods with and for the private sector. In all cases, government involvement is limited to the management of marine resources through research analyses for policy decisions. Stock assessment work being undertaken in all five target countries will be used by government as well as the industries to promote sound use of limited national resources.

Serious attention has been given to sustainability of both the fishery involved and the national capacity to monitor its development. Resources have been allocated for human resource development through long and short term training to support this objective. The economic and social viability of each activity was carefully examined with both short-term success for replication and long-term economic potential in mind (See Annexes H and I).

This project accords with the RDSS goal by aiming at sustainable economic gains from marine resources. It follows

directly the major strategy elements set out in the RDSS seeking the development of private sector small-scale marine resources activities, concentrating on commercial activities with measurable economic goals, seeking to multiply project benefits by assisting activities that are replicable and involving regional institutions that can promote the wider application of project assisted activities. The project places A I D in a leading role in the establishment of practices for the conservation and management of marine resources for the region. It is the centerpiece of the Mission's program for implementing the RDSS and will be the largest of the new projects in the South Pacific portfolio.

For the Mission, this project is a newer, more strategic and coordinated approach in a sector with which it is familiar. The project is expanding some of the most successful marine resource activities already supported.

In Papua New Guinea, the proposed activity grows out of three years of experience with U S PVOs in testing new designs for small fishing and transport vessels and establishing small boat building facilities. In Cook Islands, A I D is already funding a three year first phase of pearl oyster culture. In Tuvalu, A I D has worked with a U S PVO to establish small boat designs and a boat building enterprise which is at the center of the current project. In Tonga A I D has been providing assistance through a U S PVO for ten years in small-scale offshore bottomfish management and development and inshore resource management and is also currently funding an initial phase of work on small-scale tuna development.

A new emphasis in fisheries development came with the establishment of the Regional Fisheries Development Project in 1986 and the coming into force of the Regional Treaty on Fisheries in 1988. Under this arrangement, the Mission grants \$10 million ESF annually to the island governments through the South Pacific Forum Fisheries Agency including \$1 million per year for small projects mainly in the marine resources sector. The program also continues to provide support to the South Pacific Commission for fisheries activities, including regional tuna research and management and village level fisheries development.

By 1989, the Mission has had several years experience in being systematically involved in marine resources activities in all ten countries in the region and in working with all the major marine resources organizations active in the region. This experience will now be brought to bear on a more carefully targeted project.

The Mission's experience highlights one particularly important factor -- the U.S. has the greatest capability in tropical small-scale marine resource management and exploitation of the major donor nations. The Mission has found great strengths to draw on in the U.S. fishing industry, U.S. universities, U.S. PVO's and the U.S. National Marine Fisheries Service to implement its past programs and can expect this to continue.

C. Project Rationale and Approach

The Pacific Island nations' greatest economic need is for the expansion of income-generating activities especially in the traditional activities of agriculture and marine resources in which most of the population is engaged.

In nine of the ten RDO/SP Pacific Island countries, more than 90 per cent of the population lives in coastal areas and depends to a major degree on resources from coastal areas. The exception is Papua New Guinea, where approximately one million people, or one third of the population, live in coastal areas. The dependence on marine resources is greatest in rural areas, but even for the town populations subsistence fishing is important, and fish and other marine products provide major sources of nutrition, materials, and employment.

There are opportunities to expand substantially the economic benefits of small-scale marine resources development across the continuum from inshore reefs and lagoons to offshore banks and oceanic waters.

(1) TUNA FISHING - TONGA The waters of the South Pacific hold the largest stock of tuna in the world. Catches could be increased sustainably by at least several times. However, this resource is fished by a large-scale almost completely foreign owned fleet. Yet, expanding air links to fresh tuna markets in Japan and North America, rapidly expanding markets for high quality tuna in other developed countries of the Pacific, and the development by U.S. fishermen in the Gulf of Mexico of new methods and fishing gear for small-scale tuna fishing, now present opportunities for small-scale production of high quality tuna products by island country fishermen themselves. The challenge is to adapt these methods for use on vessels which are technically and financially within the reach of Pacific Island fishermen. That is the background of the project activity in Tonga.

(2) DEEP BOTTOMFISH - TUVALU On the outer reef slopes and on banks and seamounts there are stocks of deep bottomfish (e g groupers, snappers, etc) which are regarded as among the highest quality table fish Demand for these is strong and increasing while the fish are relatively easier to catch, handle and market than tuna (although still beyond the reach of traditional fishing methods and gear) They are also of higher value, and their supply is constant, as bottomfish are not migratory like tuna The key constraint to establishing a sustainable fishery for deep bottomfish is the susceptibility of these species to over-fishing the fishing grounds are localized and the fish are slow growing A I D has been providing assistance to Tonga for ten years in various aspects of the successful development of this fishery With lessons from this experience, the challenge to wisely utilize this resource in other parts of the region lies in developing the fishery within a strong framework of resource management That is the background of the proposed project activity in Tuvalu

(3) INSHORE FISHING - PAPUA NEW GUINEA There are underutilized inshore resources in some areas, especially Papua New Guinea, Solomon Islands and Vanuatu and in outer islands generally With increasing urbanization and cash incomes, commercial demand for fish in main centers is growing and there are opportunities to generate rural incomes by increasing local fish catches This requires better small fishing craft, improved creditworthiness of potential small-scale fishing business operators, the development and application of new fishing methods, greater understanding of market operation and improved resource management Identifying appropriate small fishing vessel designs is critical, but the greatest challenge is in integrating marketing, fish production, stock assessment and resource management That will be the basis of the activity in Papua New Guinea where technical assistance and training at basic levels for the activities mentioned are provided

(4) MARICULTURE - COOK ISLANDS There is potential for mariculture to enhance yields from wild stocks in inshore waters The lagoons of the Pacific islands provide large areas of accessible, protected water which are clean and biologically productive For now, the best opportunities appear to lie in the production of high value, low volume products based on natural stocks whose yields can be enhanced by more intensive management practices. This kind of activity is particularly important in outer islands where there are few other sources of income The challenges to successfully introducing commercial mariculture technology lie in identifying viable activities,

avoiding the disease risks typically associated with marine organism culture and resolving industry management issues That is the basis of the proposed project activity in the Cook Islands

(5) ATOLL ENVIRONMENT - KIRIBATI While the opportunities for increasing the harvest of marine resources are substantial, they are not unlimited In inshore areas particularly, stocks are susceptible to over-exploitation and to damage to the marine environment. In the longer term, marine resource management and marine environmental issues will become central in planning for small island and coastal communities as the effects of social and economic development press more closely against the limits of the complex and fragile tropical marine ecosystems In some areas, yields of reef and lagoon resources have already been reduced by over-fishing Better management can increase these yields and reduce the risk of depletion of other heavily exploited resources In other areas, yields are being reduced due to the deterioration of the marine environment from causeway construction, mangrove destruction, resort development and land reclamation There is virtually no useful information available to Pacific Island governments on the impact of these kinds of activities on the productivity of waters which they touch The level of these activities is increasing and better information and knowledge of a wider range of development options would enable better planning of these activities in future Nowhere are these activities more important than on the land-scarce, sea-dependent atolls The Tarawa atoll in Kiribati is the proposed starting point for this work The project will begin an applied research activity aimed at assisting Kiribati in identifying potential marine resource management and development opportunities as well as mitigating risks to lagoons which are the consequence of development

To realize these opportunities requires technologies to be developed, adopted and replicated, new skills to be learned and better strategies for marine resource management and development to be implemented

This is a national problem common to all the Pacific Island countries, although the opportunities and the nature of the constraints vary with their physical, economic and cultural diversity. But it is also a regional problem There are strong common elements to the problem so that solutions which are successful in one location have application elsewhere The region therefore needs applicable models However, the individual Pacific Island states are small, remote and

dispersed, their marine resource administrations are small, young and hard-pressed, and, they do not individually have the resources or the capacity to develop these models systematically

Other donors are not working towards this end. Assistance for marine resources development in the region has been modest relative to that for other sectors. The programs of traditional donors such as Australia, New Zealand and the United Kingdom are oriented towards land resource and social service development activities. More recently, Japan has provided increasing and valuable amounts of assistance for marine resources development. This assistance is more directed, however, to improving fisheries infrastructure and building modern industrial tuna fishing industries. In several cases, facilities and equipment provided by Japan provide a valuable complementary physical basis for planned A I D activities. Coordination of A I D 's efforts with Japan is important and has been initiated, but there remains the need to bring new technologies, skills and strategies to bear

D. Project Objectives and their Interrelationships

The goal of this project is to increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation and management of natural resources

This goal which is the primary objective of the entire RDO/SP program is easily linked to the marine resource development pilot activities planned for in this project. It should be noted that since the project is a pilot, its real test is in its development of replicable methods and usable resources management information at purpose level. The economic impact of individual fisheries development in each country is likely to be measurable beyond the life of the project. Increases in income for families engaged in fisheries should be measurable in the third or fourth year after the end of the project, but certainly by the tenth year. National impact in the fisheries sector in terms of employment and revenues should be measurable beginning near the end of the project

Because of the carefully developed linkages between national components and regional objectives, each country component has both a national and a regional purpose (See Figure I Project Logical Framework, and individual Country Component Logical Frameworks in Annex E)

The purpose of the project is to develop, demonstrate and make available for replication innovative technologies and strategies which increase the benefits to Pacific Island communities from sustainable, small-scale, private sector uses of marine resources

The project is expected to achieve gains at two levels At the national level, the project is designed to respond systematically to the range of opportunities set out in Section C, testing methods to establish a small-scale longlining fishery in Tonga, surveying bottomfish resources and establishing small-scale offshore bottomfishing in Tuvalu, developing coastal village small-scale commercial fishing in PNG, establishing a pearl oyster industry in the Cook Islands and researching improved marine resource management strategies in Kiribati

At the regional level, the project will

(1) test technologies for a viable small-scale tuna fishery which will in time open huge opportunities for employment and income generation in every Pacific Island nation,

(2) demonstrate a strategy for the deep bottomfish fishery designed to ensure the sustainability of the fishery emphasizing resource management needs This is a fishery which will in time be important to every country in the region,

(3) develop a strategy for the expansion of harvesting and marketing of underutilized nearshore resources which will be replicable throughout the region,

(4) demonstrate a technology for black-lipped pearl oyster culture and a strategy for establishing a pearl culture industry which will be applicable in Kiribati, Tuvalu, Tonga, Fiji, Papua New Guinea and Solomon Islands where natural stocks of black-lipped and/or gold-lipped pearl oysters occur

(5) provide the first systematic study for the region of the relationships between human settlement and the marine resources of small islands -- on Tarawa where the population density is among the highest in the world and where the impact of population growth is increasingly pushing up against the limits of the atoll ecosystem,

(6) demonstrate a single strategic approach to marine resource development -- moving commercial fishing effort beyond the reef, preserving inshore yields for subsistence purposes, encouraging the next step offshore to the outer reef slopes and seamounts, and ultimately developing a small boat bluewater tuna fishery while enhancing inshore yields through mariculture and improving the management and protection of the marine environment, and,

(7) place A I D in a leading role on marine resource management and marine environmental protection in a way that will strengthen efforts on these issues by other donors, by host governments and by regional organizations

These accomplishments representing tangible project outputs in each country and for the region. They build on previous A I D experience and funding for fisheries development and effectively complement the increasing experience and proven track record of A I D in this sector

E. Project Elements

Since this is a regional activity, it can appear complex. Each component has been designed as a self-contained project which meets the needs of a specific country or which focuses on its comparative advantage in marine resources development. At the same time, the components collectively test a full array of potentially replicable strategies for Pacific Islands nations

In its most basic terms, the project represents 37 person-years of long-term technical assistance to all five countries. Twelve person-years of short-term assistance will also be required. From a capacity building point of view, thirteen person-years of long-term training will be funded along with 42 person-months of short-term training and business or study tours

Additional inputs include vessel purchase or chartering, fishing equipment and regional dissemination costs. (See Section II below for detailed financial and cost information)

Implementation will begin in Tonga and the Cook Islands where the project will build on existing A I D -funded activities. (See Section III below)

(1) In Tonga, the project will extend and expand an exploratory fishing program now funded by A I D to test the feasibility of new small-scale tuna fishing methods by providing through charter two 35-45 foot vessels and fishing gear, long-term technical assistance (two senior fishing specialists) short-term technical assistance (naval architecture, fish marketing, fishing methods)

(2) In the Cook Islands, the project will extend and expand an experimental pearl oyster culture activity, now funded by A I D , by providing long-term technical assistance in pearl oyster culture and resource management and short-term technical assistance for pearl oyster seeding, equipment for a research training and extension center, transport services and trial farm materials

The project will subsequently establish activities in Papua New Guinea, Kiribati and Tuvalu

(3) In Papua New Guinea, the project will provide technical assistance (long and short-term) and training in Lae, Madang and Rabaul to develop small-scale fishing industries at the village level and promote marketing capacity Resource status will be assessed to determine potential and develop management regimes

(4) In Kiribati, it will provide a program of short-term technical assistance to assess marine stocks and devise resource management programs, and measure the impacts of land-based development on the lagoon ecosystem

(5) In Tuvalu, it will initially furnish long-term and short-term technical assistance to assess offshore bottomfish resources and to undertake an exploratory program of offshore bottomfishing and marketing, and then provide short-term technical assistance, equipment and training for fishing operators and boat-building operation

(6) The sixth component will support workshops, short-term technical assistance, training visits, publications and experimental programs to spread the impact of the five bilateral project components to other regional locations

II COST ESTIMATE AND FINANCIAL PLAN

A Estimated Costs and Methods of Financing

The estimated cost of this five year project is \$17.9 million with A I D contributing \$12.5 million. As outlined in Table 1, A I D funds will be expended as follows: FY1990 \$1.008 million, FY1991 \$3.463 million, FY1992 \$4.128 million, FY1993 \$3.138 million, FY1994 \$852 million. All funds are from Development Assistance accounts. The distribution of funds by component is: Cook Islands, \$2.398 million, Kiribati, \$972 million, Papua New Guinea, \$3.092 million, Tonga, \$2.337 million, Tuvalu, \$683 million and regional impact \$80 million. (See Table 2) Approximately \$582,000 will be spent on project management and coordination at RDO/SP and \$250,000 is allocated for evaluation and audit costs.

The breakdown by kind of assistance is found in Table 3 Project cost summary, technical assistance represents \$7.78 million, training \$486,000, vessel chartering/transport services \$928,000, commodities \$753,000, construction \$240,000, evaluation and audits \$250,000. The detailed cost budget tables for each component are found in Annex E for each country and Annex F for the regional impact. Standardized budgets with unit costs rates are presented with the financial analysis in Annex G.

Table 4 presents methods of implementation and financing to be used in the project. Three mechanisms will be used: two cooperative agreements and a contract. (See annex K Institutional and Management Analysis)

B Host Government Contributions

Host government contributions are outlined in Table 5. The government of Kiribati and Tuvalu are listed as least developed countries by the U N and as such are eligible for a waiver under section 124(d) of the Foreign Assistance Act from meeting the section 110(a) 25% minimum contribution requirement. Both these governments are contributing to the project. Tuvalu will not need a waiver as its project contribution is 40%. Kiribati is contributing 17.9% of total project costs and will require a waiver.

Overall, host government contributions are substantial and represent 30% of total project costs

C Audit Requirements

Primary responsibility for project audit is attributed to the Regional Inspector General's office in Manila. Funds allocated for audit in the project are for independent external audits by private firms of contractors or specific components as needed during project life.

A full analysis of project costs is presented in Annex G, Project Financial Analysis. Detailed budget tables are found there and in Annex E with their relevant country component.

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

Table 1
Summary Projection of A I D Costs by Component

Component	1990	1991	1992 (\$000)	1993	1994	Total LOP
Cook Islands	199	777	729	651	42	2398
Kiribati		330	253	277	112	972
Papua New Guinea	189	697	1121	956	129	3092
Tonga	405	751	866	315		2337
Tuvalu	13	302	289	71	8	683
Regional Impact	<u>68</u>	<u>174</u>	<u>185</u>	<u>188</u>	<u>185</u>	<u>800</u>
Sub-Total	874	3031	3443	2458	476	10,282
Evaluation/Audit		25	100	25	100	250
Project Coordination	<u>86</u>	<u>118</u>	<u>122</u>	<u>126</u>	<u>130</u>	<u>582</u>
Sub-Total	960	3174	3665	2609	706	11,114
Contingencies (5%)	48	159	183	130	36	556
Inflation (4% p a)		130	280	310	110	830
Total	<u>1008</u>	<u>3463</u>	<u>4128</u>	<u>3049</u>	<u>852</u>	<u>12,500</u>

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

Table 2
Financial Summary by Fiscal Year

	1990	1991	1992 (\$000)	1993	1994	Total LOP
1 Technical Assistance						
a) Long-term	308	1353	1670	1370	235	4936
b) Short-term	228	654	747	459	102	2190
c) Local Long-term	12	93	97	93	54	349
d) Local Short-term	5	20	10	10	5	50
e) Admin/Operating Costs	33	73	72	55	22	255
2 Training						
a) Long-term		16	74	74	8	172
b) Short-term	15	55	65	65	10	210
c) Study tours		15	59	20	10	104
3 Charter Vessels/ Transport Services	28	326	356	218		928
4 Commodities	145	306	228	69	5	753
5 Construction	100	100	40			240
6 Evaluation/Audits		25	100	25	100	250
7 Project Coordination	86	118	122	126	130	582
8 Other		20	25	25	25	95
Sub-Total	<u>960</u>	<u>3174</u>	<u>3665</u>	<u>2609</u>	<u>706</u>	<u>11,114</u>
Contingencies (5%)	48	159	183	130	36	556
Inflation (4% p a)		130	280	320	100	830
Total	<u>1008</u>	<u>3463</u>	<u>4128</u>	<u>3049</u>	<u>852</u>	<u>12,500</u>

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

Table 3

Project Cost Summary (\$000)

	A I D			Host Country	Project Total
	FX	LC	Total		
1 Technical Assistance					
a) Long-term (37 P/yr)	3700	1585	5285	953	6238
b) Short-term (140 P/mths)	1725	515	2240		2240
c) Admin/Operating Costs	<u>31</u>	<u>224</u>	<u>255</u>	<u>270</u>	<u>525</u>
Sub-Total	5456	2324	7780	1223	9003
2 Training					
a) Long-term	172		172		172
b) Short-term	105	105	210		210
c) Study tours	<u>104</u>	<u> </u>	<u>104</u>	<u> </u>	<u>104</u>
Sub-Total	381	105	486		486
3 Charter Vessels/ Transport Services	696	232	928	1280	2208
4 Commodities	715	38	753	1330	2083
5 Construction/Facilities	240		240	816	1056
6 Evaluation/Audits	250		250		250
7 Project Coordination	407	175	582		582
8 Other	<u>47</u>	<u>48</u>	<u>95</u>	<u>120</u>	<u>215</u>
Sub-Total	8192	2922	11,114	4769	15,883
Contingencies (5%)	410	146	556	240	796
Inflation (4% p a)	612	218	830	400	1230
Total	9214	3286	12,500	5409	17,909

SOURCE SELECTION INFORMATION — SEE FAR 3 104

Table 4
Methods of Implementation and Financing

<u>Method of Implementation</u>	<u>Method of Financing</u>	<u>Estimated Amount</u> (\$000)
Technical Assistance	FRLC or Letter of Commitment	7,780
Training	Letter of Commitment	486
Charter vessels/ transport services	Letter of Commitment	928
Commodities	Letter of Commitment	753
Construction	Direct Pay	240
Evaluation/Audits	Direct Pay or Cost Reimbursement	250
Project Coordination (Two PSCs)	Direct pay	582
	Sub-Total	11,019
Other costs, Inflation, Contingency		<u>1,481</u>
	TOTAL	<u>12,500</u> =====

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

Table 5

Host Country Contributions

Component	A I D	Host Country (\$000)	Total	(%)
Cook Islands	2398	1727	4125	41 9
Kiribati	972	212	1184	17 9
Papua New Guinea	3092	1414	4506	31 3
Tonga	2337	836	3173	26 3
Tuvalu	683	460	1143	40 2
Regional	800	120	920	13 0
Sub-Total	10,282	4769	15,051	31 7
Evaluation/Audit	250		250	
Project Coordination	582		582	
Sub-Total	11,114	4769	15,883	30 0
Contingency (5%)	556	240	796	
Inflation (4% p a)	830	400	1230	
Total	12,500	5409	17,909	30 2

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

III IMPLEMENTATION PLAN

The country components of the project will be obligated by bilateral agreements with each government Cook Islands, Kiribati, Papua New Guinea, Tonga and Tuvalu These components will be implemented through three mechanisms a cooperative agreement for Kiribati, a cooperative agreement for Papua New Guinea and a contract for Cook Islands, Tonga and Tuvalu Selection will be done by technical panels representing A I D and host country representatives (See Annex K for a detailed description of management arrangements and Annex E for individual country component analyses) All will be direct A I D contracts or cooperative agreements Funding for the project management function and the regional component will be obligated through contracts with the two PSCs and grants to regional organizations and PVOs

A Project Management

The project will be managed from RDO/SP by two project-funded PSCs reporting to the Agricultural Development Officer One will be overall project coordinator and the other will manage the regional impact component In order to implement the project, RDO/SP will require assistance from the Regional Legal Advisor for project agreement clearance and the Regional Contracting Office in Manila for the preparation of competitive solicitations, contractor selection, contract and cooperative agreement selection

B Technical Assistance Responsibilities

Each of the three contractors used to implement the project will be responsible for all technical assistance needed in that component, short-term study tours, commodities, vessel chartering and construction The composition of the technical assistance teams are described in each country component (Annex E) along with all other necessary inputs

The firm and/or PVO managing the Cook Islands, Tonga and Tuvalu contract will have a contract Chief of Party based in Tonga and travel capability to the two other sites on an agreed upon schedule The university implementing the Kiribati component will have a marine resources advisor who acts as team leader located there The PVO, firm and/or university implementing the Papua New

Guinea activities will have a team leader based there and managing all the PNG activities from one of the target communities (Lae, Madang or Rabaul)

The technical assistance personnel will become part of the existing fisheries administrations within the various countries. While the teams will report to RDO/SP, it is expected that they will, to the extent possible, work through the administrations to which they are assigned.

C Commodities Procurement

The source of goods provided under the project will be the United States or the cooperating countries. In some limited cases, fishing gear or scientific equipment may only be available from non-U S sources. These will be individually evaluated by RDO/SP and would fall within the delegation of authority value limits of the Regional Director. Any contractor or cooperating organization selected under the project will have to show procurement capability or how it will handle project procurement needs through sub-contracting arrangements with experienced firms or organizations. Commodities to be purchased under the project total \$753,000 and final commodity lists will be approved by host country counterparts and RDO/SP. Vessel chartering and transport services total \$928,000.

D Training

Long-term training and selected short-term training will be handled by the RDO/SP Training Advisor in consultation with host country training staff. The handling of all RDO/SP participant training, including selection of candidates and monitoring of programs, will be done in accordance with A I D Handbook 10 (Participant Training). All the participating countries will be encouraged to take these steps: 1) assure that women are adequately represented among potential candidates, 2) ensure that participants return home from training and apply skills to marine resource management research or private sector development and 3) agree to continue the participant's salary while in training.

Key implementation actions are outlined in the Implementation Schedule which follows.

E Gray Amendment Considerations

To the maximum extent possible, RDO/SP will encourage in its solicitation for cooperative agreements or contracts under this project the participation of minority and 8(a) firms, small and disadvantaged business, women-owned firms and all organizations included under the Gray Amendment to the Foreign Assistance Act. This participation could include prime contracting and/or subcontracting arrangements.

IMPLEMENTATION SCHEDULE

COMPONENT	ACTIVITY	RESPONSIBILITY	SCHEDULE (in quarters)				
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
PROJECT	PP Approved	ANE	1				
	RFP Issued in CBD	Contracts	2				
	ProAgs signed	RDO/SP	1				
	Review committee established for Cooks, Tonga Tuvalu	RDO/SP	2				
	Review Committee established for Kiribati	RDO/SP	3				
	Review Committee established for Papua New Guinea	RDO/SP	3				
	Contractor selected for Cooks Tonga, Tuvalu	RDO/SP	3				
	Contractor selected for Kiribati	RDO/SDP	4				
	Contractor selected for PNG	RDO/SP	4				
	Contractors' long term personnel approved	RDO/SP	XXXXXX				
	Midterm review	RDO/SP				4	
REGIONAL	Component initiated	RDO/SP	1				
	Technical assistance	RDO/SP		XXXXXXXXXXXXXX			
	Sort term training	RDO/SP		XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX			

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COMPONENT	ACTIVITY	RESPONSIBILITY	SCHEDULE (in quarters)				
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
COOK ISLANDS							
	Pearl oyster management plan completed	GOCI	1				
	Project Agreement signed	GOCI & RDO/SP	1				
	Criteria for contractor selection established	RDO/SP (with GOCI input)	1				
	Technical Assistance team selected	Contractor, GOCI, RDO/SP	3				
	Long term trainees selected	GOCI, Contractor, RDO/SP	3				
	Vessel chartered	Contractor	4				
	Vessel operating	Contractor		1			
	Suvarrow facility built	GOCI, Contractor	XXXXXXXX				
	Suvarrow facility equipped	Contractor, GOCI		XXXXXX			
	Suvarrow facility staffed (including counterparts)	GOCI		XXXXXX			
	Suvarrow pearl farm established	GOCI Contractor		2			
	First oysters seeded	GOCI Contractor		2			
	Training initiated at Suvarrow	Contractor GOCI		2			
	Oyster Specialist TDY	Contractor		2	2	2	
	Disease specialist TDY	Contractor		3			

IMPLEMENTATION SCHEDULE

COMPONENT	ACTIVITY	RESPONSIBILITY	SCHEDULE (in quarters)				
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
KIRIBATI							
	Project Agreement signed	RDO/SP & GOK	2				
	Criteria for contractor selection established	RDO/SP with GOK input	3				
	Donor coordination conference	Contractor		1			
	Technical assistance team selected	Contractor, GOK RDO/SP					
	Kiribati staff and counterparts selected	GOK, USP, RDO/SP contractor		1			
	Household surveys initiated	Contractor GOK		1			
	Fisheries, benthos micro biological and oceanographic surveys begin	Contractor		2			
	Atoll mapping completed	Contractor			1		
	Fisheries management plans completed	Contractor				2	
	Clam management plan completed	Contractor				2	
	Atoll hydrographic survey completed	Contractor				4	
PAPUA NEW GUINEA							
	Project agreement signed	RDO/SP, GOPNG	2				
	Criteria for contractor selection established	RDO/SP, GOPNG	2				
	Technical assistance team selected	Contractor RDO/SP GOPNG		2			
	Long term trainees selected	GOPNG RDO/SP	4				
	Detailed design completed	RDO/SP contractor GOPNG		1			
	Workshops initiated	Contractor GOPNG		3			
	Resource surveys initiated	Contractor, GOPNG		2			
	Boat design recommendations completed	Contractor			4		

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of

COMPONENT	ACTIVITY	RESPONSIBILITY	SCHEDULE (in quarters)				
			YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5
TONGA							
	Project agreement signed	RDO/SP GOT	1				
	Criteria for contractor selection established	RDO/SP GOT	1				
	Technical assistance team selected	Contractor GOT RDO/SP	2				
	Long term trainees selected	GOT Contractor RDO/SP		2			
	Vessels chartered and refitted	Contractor	2				
	Fish aggregating devices deployed	Contractor		XXXXXXX			
	Longlining trials completed	Contractor				4	
	Bottomfish assessment completed	Contractor				4	
	Naval architect designs complete	Contractor				4	
	Recommendations on optimal vessel and fishing methods completed	Contractor					4
TUVALU							
	Project agreement signed	RDO/SP GOT	2				
	Criteria for contractor selection established	RDO/SP GOT	2				
	Technical assistance team selected	Contractor, RDO/SP GOT	4				
	Long term trainees selected	GOT RDO/SP Contractor	4				
	Counterparts selected	GOT Contractor RDO/SP	3				
	Bottomfish assessment completed	Contractor GOT				4	
	Naval architect design complete	Contractor		4			
	Bottomfish fishery established	Contractor GOT					3

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IV MONITORING AND EVALUATION PLAN

The project activities require ongoing monitoring in each country to provide an empirical basis for evaluating effectiveness of tested technologies and strategies for replication in a demonstration phase, both in-country and elsewhere in the region. This project is primarily oriented toward testing technologies and regular data collection will focus on critical technical considerations influencing performance and replicability. Where commercial viability of strategies is being tested, project information systems will allow estimates of profitability and potential economic gains. Economic impact data will be gathered in all components by comparison with project-generated baseline information formed by stock assessments and resource management plans.

Key Issues for Monitoring

The project will be implemented by three management units as described in Section III. The primary vehicle for RDO/SP to oversee implementation progress will be the preparation of annual workplans and submission by contractors of quarterly and annual progress reports. Quarterly reports will focus on achievement of outputs as specified in component Logical Frameworks. Annual reports will focus on progress toward achievement of EOPS. Priority outputs of each country component to be emphasized by the ongoing monitoring program are listed in each component Logical Framework shown in Annex E.

All components will be required to collect gender disaggregated income and participation data. As noted in the Social Soundness Analysis (Annex I), women's active participation in project activities will be of particular importance in Papua New Guinea and the Cook Islands. In Kiribati, the results of the lagoon management research will be integrated with community data to ensure the appropriateness of environmental planning.

The regional component will be implemented by the RDO/SP PSC supplemented by short-term technical assistance and cooperation by regional organizations. Monitoring of the regional component will require annual assessments initially.

concerning implementation status in each country component toward reaching important milestones for determining pilot activity replicability. In the out-years of the project, RDO/SP's annual assessment will address the replicability potential of each component, actions taken to disseminate results, and public or private initiatives taken to apply the technologies and strategies advocated.

EVALUATION PLANS

A mid-term evaluation will be completed in year three of the project. At this point all the project components should have demonstrable and comparable results available. For example, the Suwarrow facility will be fully operational by the third year and assessment of lagoon carrying capacities will be completed. In Tonga, bottomfish MSY estimates and gear and technology testing sufficiently progressed to be able to determine the likelihood of reaching purpose level. In Tuvalu, the resource assessment phase will be completed. In Kiribati, a research capability should be operating by year three and contributing to national planning. In Papua New Guinea, project operations should have completed the activity targeting and analysis work and be implementing fishing and marketing activities with the selected communities. On a regional level, information on potential replicability should be available by year three and substantial amounts of data dissemination through regional organizations and publications should have been achieved. All these factors support a timing for the mid-term evaluation in the third year. The evaluation team should include a fisheries development specialist, sociologist, fisheries economist and management/information dissemination specialist. The key issues for this evaluation should be

- Validity of purpose statements for each national component and likelihood of achieving them
- Appropriateness of outputs for each component and progress (planned versus actual) in achieving them
- Validity of project design assumptions
- Likelihood of replication in other countries and potential time frame

- State of fisheries sector resource management and planning in each country and its linkage with project outcomes
- Potential for sustainable research capacity development in Kiribati including additional input needs from A I D or other donors
- Potential for Papua New Guinea fisheries development project expansion and possible project input increases
- Usefulness of regional impact strategy and need for project input increases

A final evaluation should be planned for late in the fourth year of the project to determine if a next phase is warranted. This could include pre-design issues and feasibility for either a demonstration phase in all ten countries or expansion into new sectors in project countries, such as research and development of tuna longlining in Tuvalu.

V. SUMMARIES OF ANALYSES

The following summaries indicate major issues and conclusions from the detailed analyses included in the Annex. It is significant to note that this project includes six elements (five countries and a regional component), with conditions in some countries similar, but others quite different. Nevertheless, the recognition of the importance of marine resources by all host governments indicates their future reliance on renewable resources from the sea. The intent is to test strategies which are transferable from one island group to another, and especially to rely on adoption by the private sector.

A Economic Analysis

The starting point for the economic analysis for the project set out in Annex H is the projected growth in global demand for marine products in the face of limited wild stocks in the world oceans. For instance, fish consumption has risen by 25 per cent in North America in the past five years. Global demand for fish is projected to increase by at least 30 per cent between 1985 and the year 2000, to 113 million metric tons (mmt). Production of fish from the world oceans is projected to level off at 100 mmt, with the balance of demand being supplied from cultured fish products. With this background average prices for marine products can be projected to continue to increase in the medium to long-term.

The island nations of the Pacific are ideally situated to benefit from the growing world demand for marine products. The strongest comparative economic advantage of the Island states is in the provision of marine products. The region has abundant stocks of wild fish resources which are in many cases under-utilized in a world in which wild fish resources are increasingly fully exploited. The region also has extensive areas of clean, productive, accessible waters suitable for cultivating marine organisms in a world in which physical development activities onshore and in the water, place increasing stress on coastal areas and cause deterioration of the quality of coastal waters. Transport links from the South Pacific to major markets for marine products are steadily improving in frequency, cost and quality.

The project design has identified a number of opportunities for the Pacific island states to improve the exploitation of

their comparative advantage in marine products, with technologies and strategies that can be taken up by small-scale private enterprises. The economic analysis sets out the results of investigations of the financial viability of small-scale private sector production for each project-assisted activity. Based on results from preliminary testing phases or on data from similar kinds of operations as those to be assisted by the project, the analysis concludes that there is a high probability that project components will provide sufficiently high returns to encourage sustained participation by small-scale private producers without substantial sustained recurrent government involvement.

B Social Soundness Analysis

The social soundness analysis set out in Annex I identified four areas of particular importance: a) issues related to acceptance of the innovations, b) issues related to the impacts of the innovations, c) safety of the innovations, and d) consequences of the innovations for women and families.

The analysis revealed that the project design adequately addressed all social issues, and that there appear to be no intractable social constraints on project activities.

Benefits of the project were mainly in the areas of increased income to producers and the secondary positive consequence of higher incomes for quality of life of families, including women and children.

Of special note as issues for monitoring over the course of the project are:

- questions regarding participation in the project (e.g. will there be sufficient numbers of Tuvaluan fishermen willing to spend longer periods of time at sea as required by the project?),
- the involvement of women in the project (e.g. will traditional women become marketers of fish in Papua New Guinea?),
- sociocultural change brought about by the project efforts (e.g. will greater fishing incomes in Tonga lead to a weakening of service to the community by successful individuals and thus to conflicts?),
- the spread effect (e.g. will communities near the project target communities in Papua New Guinea emulate successful project communities?), and
- safety (e.g. will greater blue water fishing effort result in an increase in accidents in Tonga and Tuvalu?)

Overall, from a sociocultural perspective, the project appears sound and has addressed social needs and potential constraints adequately

C Environmental Analysis

At the PID stage, a negative determination was made for Kiribati, Tonga, and the regional component, with the other components left for further analysis in the PP. A negative determination is recommended for the other three components, Tuvalu, Cook Islands, and Papua New Guinea. In all cases, the living marine resources in question will fall under greater protection through rational management policies integrated into the development scheme, thereby resulting in a positive, rather than negative effect. If left to develop without such control, overcapitalization, and over-fishing would be likely. This is especially important for the bottomfishes, which are easily depleted. Species diversity should not be altered by catch levels lower than the maximum sustainable yield, which will be integrated into the management plans for each fishery. This analysis applies especially to Tuvalu, which is only a decade behind Tonga in development of its deep water resources.

As the approach for Papua New Guinea has changed since the PID stage, in consultation with the GPNG, the effect of the construction of market facilities is no longer an environmental issue.

Environmental assessments were included in Annex J for the Cook Islands, Tuvalu and Papua New Guinea. The site of a pearl culture research station is at Suvarrow atoll, a Cook Islands national park. The analysis concludes that there will be no significant environmental damage from facility construction, human habitation, or oyster culture. The major issue is potential spread of vibrio-type disease in the oyster population. This is addressed in a pearl oyster management plan, required of the GOCI prior to initiation of the project.

D. Institutional and Management Analysis

This analysis describes the institutional focus of project activities and management arrangements for project implementation. The project is primarily a private sector oriented income-generating pilot activity and as such is being

implemented by A I D contractors in tandem with private groups, except in Kiribati where a U S university will work with the existing University of South Pacific (USP-ARDU)

RDO/SP oversight of project operations will be carried out part-time by the ADO, assisted full-time by two PSCs. One PSC will act as the Marine Resources Advisor and manage all aspects of project implementation. The other PSC will be responsible for dissemination of project results through coordination with regional institutions (FFA, USP and SPC). The project itself will have three management units. The Tonga, Cook Islands, and Tuvalu components will be awarded as a single contract following competitive bids by a U S firm, university, PVO, or consortium of these. This project unit will be based in Tonga. The exact allocation of personnel time among the three sites is to be determined during project start-up, although initially more time may be needed in Tonga and Cook Islands since those components will be ready to start quickly. The Papua New Guinea component will be implemented as a separate cooperative agreement also by a U S firm, university, PVO or consortium. This organization or set of organizations will report to the RDO/SP Assistant Director in PNG on all policy and administrative issues and to RDO/SP in Suva for technical oversight and project management. The Kiribati component will be awarded as a second cooperative agreement with a U S university. The university will report to RDO/SP in Suva and will maintain a full-time staff on Tarawa at the ARDU.

In the Cook Islands, the research facility at Suvarrow will be operated by the GOCI Ministry of Marine Resources with the cooperation of the National Conservation Authority (a private organization entrusted by government to oversee national parks and conserve wildlife resources). Since Suvarrow is a national park, private firms cannot set up facilities there.

Stock assessment work for specific fisheries in Tonga and Tuvalu will be completed with project supplied experts working with government marine resource personnel. No alternative counterpart human resources are available as the USP is not conducting research or teaching courses related to marine resources in these countries.

In Kiribati an existing institution, the ARDU, will be used to implement the research program. As an outpost of USP, this unit has the potential to develop into an applied atoll research center for the region. The institutional development planned for the ARDU is modest and focused on tangible gains in limited high-priority applied research areas. Improvements in linkages with government decisions will determine whether

the ARDU can fulfill its national as well as regional objective under the project

In Papua New Guinea, the project will work directly with village and town private sector fishing and marketing activities. No government organizations will be directly involved in implementation but local authorities will be supplied project survey and planning results and will participate in activity selection. Government is particularly interested in monitoring the results of the community survey and the role of women in fisheries (see Annex I, Social Soundness)

As noted in the regional impact component described in Annex F, the project will use several existing regional institutions for project results dissemination and information sharing. The SPC will be used to disseminate technical and scientific information and the FFA focus on economic and policy information generated by the project. Regularly scheduled meetings and workshops planned by these organizations will be used to disseminate project results. The project will fund a small number of workshops and meetings to supplement regional organization meetings as needed. The regional PIMRIS information system will receive project-generated documents for dissemination throughout the region. These reports will provide results of stock assessments in all five countries for key fisheries and data on MSYs for these fisheries as they are determined. In addition, the project will generate data on technologies and methods for longline and bottomfishing which will also be available for dissemination to Pacific Island countries through regional institutions. (See Figure K-1 for outline of project MIS and interrelationships of information available for decisions on fisheries development through the project)

VI. CONDITIONS AND COVENANTS

Individual project agreements will be signed with each of the five participating countries. In addition to the usual condition concerning authorized representatives for each country, the Cook Islands component will contain one condition precedent for disbursement of funds.

Prior to release of funds, the grantee will approve the national pearl industry management plan currently nearing completion by the Ministry of Marine Resources. Further, only those islands whose councils have approved the national plan will be eligible to receive project funds or to participate in research and training activities at the Suvarrow station.

Covenants

General

In addition to the usual covenant concerning evaluations, each grant agreement will include one covenant:

The grantee covenants that each person who goes to the United States for training under the project will agree to return to his/her country and work for the grantee on project activities for a period of time at least twice the length of time spent in A I D -financed training. In addition, the grantee agrees to continue salary of any government employee receiving A I D -financed training while they are completing their training program.

Kiribati

The Grantee covenants to active participation in the Atoll Research Development Unit (ARDU) advisory committee to set research priorities which will support its national objectives.

Papua New Guinea

A specific covenant for Papua New Guinea asks the grantee to covenant that each long-term advisor funded under the project will have a GPNG counterpart (except the team leader) during the entire length of his or her assignment.

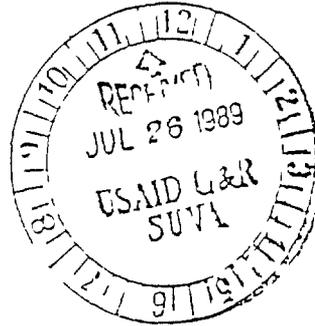
ANNEX A

PID APPROVAL CABLE

ACTION AND INFO EXEC

7ZC2CVA0277
PP RUC 7A
DA 7JDFC #4448 2360241
ZNR JUUUU ZZB
P 250238Z JUL 89
FM SECRETARY OF STATE
TO AMEMBAST SJVA PRIORITY 0021
UNCLAS STATE 23444

LOC: 178 032
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CN: 02543
JFRG: AID
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TAGS

SUBJECT: SOUTH PACIFIC REGIONAL PACIFIC ISLAND MARINE
RESOURCES PROJECT (879-7023) -- ASSISTANT ADMINISTRATOR
APPROVAL OF PID

REFERENCE: A SJVA 02110, B STATE 134714

1. SUMMARY: AMEMBAST APPROVES THE PROJECT
IDENTIFICATION DOCUMENT (PID) FOR THE PACIFIC ISLANDS
MARINE RESOURCES PROJECT. RUC/SP SHOULD PROCEED TO
PREPARE A PROJECT PAPER (PP) FOR THE PROJECT. THE PP
SHOULD CONSIDER ALTERNATE NON-GOVERNMENTAL APPROACHES
TO ASSISTANCE FOR MARINE RESOURCES DEVELOPMENT. END
SUMMARY

2. THE PROJECT REVIEW COMMITTEE (PRC) MET JUNE 5 WITH
RUC/SP ASSISTANT DIRECTOR OSBORN TO REVIEW MISSION'S
RESPONSE (REFTEL A) TO PRC QUESTIONS ABOUT ASSISTANCE TO
GOVERNMENT AND PRIVATE RECIPIENTS AS FOLLOWS: REFTEL B

3. THESE QUESTIONS WERE RESOLVED WITH RESPECT TO THE
PROJECT PURPOSE. IT IS TO INCREASE THE BENEFITS OF
PRIVATE SECTOR SUSTAINABLE USES OF MARINE RESOURCES

HOWEVER, ON THE ISSUE OF THE EXTENT TO WHICH THE PROJECT
USES GOVERNMENTAL APPROACHES TO ACHIEVING THE PURPOSE,
WE LOOK TO THE PP DESIGN PROCESS TO INVESTIGATE WHETHER
THERE ARE PRACTICABLE NON-GOVERNMENTAL MEANS OF
ACHIEVING ASSISTANCE OUTPUTS AND PROVIDING INPUTS.
PROJECT COMMITTEE FELT THAT PID APPEARED TO ASSUME
GOVERNMENTAL ENTITIES FOR A NUMBER OF ASSISTANCE
APPROACHES FOR WHICH NON-GOVERNMENTAL ALTERNATIVES MAY
BE AVAILABLE.

IN PARTICULAR, THE PP SHOULD DISCUSS THE MEANS OF
PROVIDING TRANSPORTATION SERVICES, CONDUCT OF RESEARCH,
AND PROVISION OF MARKETING FACILITIES IN THE COOK
ISLANDS, TONGA AND PAPUA NEW GUINEA SUB-PROJECTS

WE FELT THAT SUCH ACTIVITIES AS PROVIDING BOATS FOR
TRANSPORT IN THE COOK ISLANDS GOVERNMENT SHOULD BE
TESTED AGAINST THE POSSIBILITIES OF PRIVATE PROVISION OF
TRANSPORT SERVICES OR OF CHARTERING A BOAT FOR THE

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DUE DATE	7/28
ACTION TAKEN	1/1/89

SEARCH OF RATION

AMONG ALTERNATIVES TO BE CONSIDERED WOULD BE POSSIBLE RESEARCH AND CONSERVATION ROLES OF UNIVERSITIES, VOLUNTARY AGENCIES, THE FECC, REGIONAL ORGANIZATIONS AND OTHER DONORS THE PP SHOULD ALSO CONSIDER WHETHER THE MARKETING ACTIVITIES IN PNG COULD BE OWNED AND/OR MANAGED PRIVATELY RATHER THAN BY GOVERNMENT

OF COURSE, IT MAY NOT BE COST EFFECTIVE UNDER ALL ISLAND CONDITIONS TO FIND PRIVATE OR NON-GOVERNMENTAL MEANS OF ACHIEVING ASSISTANCE OBJECTIVES AT REASONABLE COST THE PP SHOULD INDICATE THE ANALYSIS BEHIND ANY FINDING THAT ONLY GOVERNMENT MECHANISMS ARE PRACTICABLE

4 WE ARE ALSO CONCERNED AT SUSTAINABILITY OF PROJECT ACTIVITIES AS CLEAR IN THE PP WHERE GOVERNMENT SERVICES ARE NECESSARY TO CONTINUE THE FLOW OF BENEFITS (E.G., IN DISEASE CONTROL FOR PEARL PRODUCTION), THE PP SHOULD ASSURE THE COSTS OF CONTINUING THESE SERVICES AND PROSPECTS THAT THE GOVERNMENT CAN DO SO AFTER OUR ASSISTANCE ENDS SIMILARLY, WE ARE CONCERNED THAT INSTITUTIONALIZATION OF PROJECT ACTIVITIES OCCURS WHERE NECESSARY (E.G., THE PNG FISH MARKETING ACTIVITY SHOULD BE STRUCTURED TO ASSURE THAT AN ENTITY MANAGING THE MARKETS TO ATTRACT SMALL VENDORS WILL CONTINUE BEYOND THE PROJECT)

5 OTHER CONCERNS WERE RESOLVED AS FOLLOWS

- A EVALUATION MEASUREMENT OF IMPACTS WAS DISCUSSED IN CONTEXT OF THE REVIEW OF THE MANAGEMENT PLAN

- B STATUTORY CHECKLIST EACH SUB-PROJECT WITH A SINGLE COUNTRY WILL BE SUPPORTED WITH A CHECKLIST FOR THAT COUNTRY

- C WID THE PP SHOULD ALSO INDICATE WHETHER OPPORTUNITIES FOR PARTICIPATION OF WOMEN IN PROJECT ACTIVITIES AND BENEFITS WILL BE ADVANCED

PRC CONGRATULATES MISSION ON A GOOD FIRST PROJECT DESIGN UNDER THE NEW INCOME IMPROVEMENT STRATEGY IT MAKES A SUBSTANTIAL STEP UP TO LARGER PROJECTS WITH MORE MEASURABLE IMPACTS THAT THE STRATEGY REQUIRES

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1/1/84

ANNEX B

PROJECT LOGFRAME

PACIFIC ISLANDS MARINE RESOURCES

ANNEX B

LOP 1989 1994

Funding \$12 500

LOGICAL FRAMEWORK

Date of Preparation 8/89

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROGRAM OR SECTOR GOAL</u>	<u>MEASURE OF GOAL ACHIEVEMENT</u>		
To increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation and management of natural resources	<ol style="list-style-type: none"> 1 Increase in numbers of men and women engaged in small scale marine resources production 2 Increased income from small scale marine resources activities in target countries by year 10 3 Increased local sales and exports of marine resources by EOP 	<ol style="list-style-type: none"> 1 Project measurement of the regional marine economy 2 Trade statistics 3 National income accounts 4 Local marine resources market data on the value of sales and prices 	<ol style="list-style-type: none"> 1 Projected marine products market conditions are maintained or improve 2 Comparative economic advantages of the Pacific Islands in small scale marine products are maintained or improve 3 Government and communities have adopted measures necessary for the conservation and management of marine resources and are monitoring their use

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PACIFIC ISLANDS MARINE RESOURCES

ANNEX B

LOP 1989 1994

Funding \$12 500

LOGICAL FRAMEWORK PAGE 2

Date of Preparation 8/89

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROJECT PURPOSE</u>	<u>END OF PROJECT STATUS</u>		
<p>1 To develop, demonstrate and make available for replication innovative technologies and strategies which increase the benefits to Pacific Island communities from sustainable small scale private sector uses of marine resources</p>	<p>1 Technology and strategies for small scale private marine resources development have been tested and information is available on where and when these technologies and strategies work</p> <p>2 Technologies and strategies for which test results have been positive have been applied in the target locations with measurable increases in output of marine products by small scale enterprise</p>	<p>1 Project reports evaluations and monitoring</p> <p>2 Measures of production investment and participation from Government marine resources survey data and reports designed for resource assessment monitoring and management</p> <p>3 Local marine resources market data on sales volumes</p> <p>4 Export statistics on volumes of marine products</p> <p>5 Reports of meeting of regional fisheries organizations</p> <p>6 Government reports and legislation relating to marine resource management</p> <p>7 Volumes of lending reported for investment in project assisted marine resource sectors</p>	<p>1 No dramatic changes in oceanographic or climatic conditions</p> <p>2 GOT adopts a program to limit bottomfish catches</p> <p>3 Conditions in Tonga for small scale tuna fishing are reasonably representative of conditions in other areas of the Pacific Islands region</p>

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PACIFIC ISLANDS MARINE RESOURCES

ANNEX B

LOGICAL FRAMEWORK PAGE 3

LOP 1989 1994

Funding \$12 500

Date of Preparation 8/89

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
<p>1 Small scale tuna fishing strategy (optimal vessel size, fishing methods, market arrangements with off season bottom fishing) determined for Tonga</p> <p>2 Stock assessment completed and viability of sustainable commercial scale bottomfishing tested for Tuvalu</p> <p>3 Improved pearl mariculture methods developed and viability of commercial scale black pearl production tested for the Cook Islands</p> <p>4 Local fish marketing and production expanded in targeted coastal areas of Papua New Guinea</p> <p>5 Replicable strategies formulated for managing atoll marine resources based on applied research in Kiribati</p> <p>6 Results of the pilot activities are disseminated for replication elsewhere in the region</p>	<p>1a Catch and effort data for alternative boat sizes and longlining methods</p> <p>1b Cost and earnings data for vessel trials</p> <p>2a MSY for bottomfish estimated</p> <p>2b Net earnings and catch/effort data for trial operations</p> <p>3a Results of 3 year pearl oyster culture technology trials</p> <p>3b Estimates of carrying capacity of lagoons on four islands for pearl farming</p> <p>3c Price production and cost data for sample of pearl producers</p> <p>4 Baseline trend and post test data on costs earnings and catch/effort for training participants</p> <p>5 Management strategies specify relationships between fishing practices/land based development and biological characteristics of shellfish and finfish influencing sustainability of stocks</p> <p>6 Number of public or private initiatives that apply pilot technologies or strategies</p>	<p>1a Contractor reports and special studies</p> <p>1b RDO/SP's 879 0009 project data</p> <p>2a 12 month stock assessment cruises data from previous surveys and interviews with local vessel operators</p> <p>2b Catch/effort logsheets and interviews with local vessel operators</p> <p>3a Contract reports and special studies</p> <p>3b MMR survey data</p> <p>3c GOCI reports on pearl oyster industry</p> <p>4 Contractor reports and special studies</p> <p>5a Contractor reports</p> <p>5b GOK Fisheries Division catch/effort data</p> <p>6 Survey of government officials by RDO/SP</p>	<p>1 Suitable private and public sector participants for training can be identified</p> <p>2 Levels of technical assistance training provided are sufficient to allow for adequate pilot testing of technologies and strategies</p> <p>3 Regional organizations involved in dissemination maintain interest in aspects of fisheries development which the project is targeting</p>

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PACIFIC ISLANDS MARINE RESOURCES

ANNEX B

LOGICAL FRAMEWORK PAGE 4

LOP 1989 1994

Funding \$12,500

Date of Preparation 8/89

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>INPUTS</u>			
A I D 27 person years of offshore long term T A mainly fisheries scientist fisheries technical specialist including fishing specialist, boatbuilding, marketing experts, 140 person months of short term T A , 10 person years local/regional long term T A 13 person years of long term training in the U S in country and at regional locations, charter vessels for fisheries research surveys, trial fishing and transport services, commodities mainly trial fishing gear and materials, and construction materials	Type of Input Long term T A Short term T A Training Charter vessels/ transport services Commodities Construction Other Sub Total	A I D Host Government Regional Organizations (U S \$000) 5285 953 2240 486 928 1280 753 1330 240 816 350 390 10,282 4769	Project Documentation and 1 Experts can be found to live in small island locations governmental regional organization records 2 Host Governments can identify and make available suitable counterparts and training program participants
Host Governments counterparts, vessels for trial fishing and research, facilities, project support	Evaluation/ Audit/ Coordination Subtotal	832 11 114 4769	
	Contingency Inflation Total	556 240 830 400 12 500 5409	

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ANNEX C

STATUTORY CHECKLISTS

ANNEX C

STATUTORY CHECKLISTS

COUNTRY CHECKLIST

Five Countries are included in this project, Cook Islands, Kiribati, Papua New Guinea, Tonga and Tuvalu. The country checklist for Papua New Guinea was included in the Child Survival Project (879-0017) and is not repeated here. Responses to the following questions are applicable to the remaining four countries unless otherwise noted. Checklists which apply to (A) FAA funds generally and (B) Development Assistance funds only are used. (B) (2) is for ESF only and is not applicable.

A GENERAL CRITERIA FOR COUNTRY ELIGIBILITY

- 1 FY 1989 Appropriation Act Sec 578(b)
Has the President certified to the Congress that the government of the recipient country is failing to take adequate measures to prevent narcotic drugs or other controlled substances which are cultivated, produced or processed illicitly, in whole or in part, in such country or transported through such country, from being sold illegally within the jurisdiction of such country to United States Government personnel or their dependents or from entering the United States unlawfully? No

- 2 FAA Sec 481(h), FY 1989 Appropriations Act Sec 578, 1988 Drug Act Secs 4405-07
(These provisions apply to assistance of any kind provided by grant, sale, loan, lease, credit, guaranty, or insurance, except assistance from the Child Survival Fund or relating to international narcotics control, disaster and refugee relief, narcotics education and awareness, or N/A

the provision of food or medicine)
If the recipient is a "major illicit
drug producing country" (defined as a
country producing during a fiscal
year at least five metric tons of
opium or 500 metric tons of coca or
marijuana) or a "major drug-transit
country" (defined as a country that
is a significant direct source of
illicit drugs significantly affecting
the United States, through which such
drugs are transported, or through
which significant sums of
drug-related profits are laundered
with the knowledge or complicity of
the government) (a) Does the country
have in place a bilateral narcotics
agreement with the United States, or
a multilateral narcotics agreement?
and (b) Has the President in the
March 1 International Narcotics
Control Strategy Report (INSCR)
determined and certified to the
Congress (without Congressional
enactment, within 45 days of
continuous session, of a resolution
disapproving such a certification),
or has the President determined and
certified to the Congress on any
other date (with enactment by
Congress of a resolution approving
such certification), that (1) during
the previous year the country has
cooperated fully with the United
States or taken adequate steps on its
own to satisfy the goals agreed to in
a bilateral narcotics agreement with
the United States or in a
multilateral agreement, to prevent
illicit drugs produced or processed
in or transported through such
country from being transported into
the United States, to prevent and
punish drug profit laundering in the
country, and to prevent and punish
bribery and other forms of public
corruption which facilitate

production or shipment of illicit drugs or discourage prosecution of such acts, or that (2) the vital national interests of the United States require the provision of such assistance?

- 3 1986 Drug Act Sec 2013, 1988 Drug Act Sec 4404 (This section applies to the same categories of assistance subject to the restrictions in FAA Sec 481(h), above) If recipient country is a "major illicit drug producing country" or "major drug-transit country" (as defined for the purpose of FAA Sec 481(h), has the President submitted a report to Congress listing such country as one (a) which, as a matter of government policy, encourages or facilitates the production or distribution of illicit drugs, (b) in which any senior official of the government engages in, encourages, or facilitates the production or distribution of illegal drugs, (c) in which any member of a U S Government agency has suffered or been threatened with violence inflicted by or with the complicity of any government officer, or (d) which fails to provide reasonable cooperation to lawful activities of U S drug enforcement agents, unless the President has provided the required certification to Congress pertaining to U S national interests and the drug control and criminal prosecution efforts of that country?

N/A

- 4 FAA Sec 620(c). If assistance is to a government, is the government indebted to any U S citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies, (b) the debt is not denied or contested by such government, or (c) the indebtedness arises under an unconditional guaranty of payment given by such government or controlled entity?

No South Pacific government is currently in violation of FAA Sec. 620(c)

- 5 FAA Sec 620(e)(1) If assistance is to a government, has it (including any government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U S citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?
- On two occasions in the past few years, American tuna boats were seized by governments which found them intruding into their declared EEZ. Fines were paid and the boats were returned to the U.S owners
- 6 FAA Secs 620(a), 620(f), 620D, FY 1989 Appropriations Act Secs 512, 550, 592 Is recipient country a Communist country? If so, has the President determined that assistance to the country is vital to the security of the United States, that the recipient country is not controlled by the international Communist conspiracy, and that such assistance will further promote the independence of the recipient country from international communism? Will assistance be provided either directly or indirectly to Angola, Cambodia, Cuba, Iraq, Libya, Vietnam, South Yemen, Iran or Syria? Will assistance be provided to Afghanistan without a certification, or will assistance be provided inside Afghanistan through the Soviet-controlled government of Afghanistan?
- No
- 7 FAA Sec 620(j) Has the country permitted, or failed to take adequate measures to prevent, damage or destruction by mob action of U S property?
- No
- 8 FAA Sec 620(l) Has the country failed to enter into an investment guaranty agreement with OPIC?
- No

- 9 FAA Sec 620(o), Fishermen's Protective Act of 1967 (as amended) Sec 5 (a) Has the country seized, or imposed any penalty or sanction against, any U S fishing vessel because of fishing activities in international waters? (b) If so, has any deduction required by the Fishermen's Protective Act been made? No Vessels have been seized in the EEZ's, which are not considered international waters. N/A under circumstances.
- 10 FAA Sec 620(g), FY 1989 Appropriations Act Sec 518 (a) Has the government of the recipient country been in default for more than six months on interest or principal of any loan to the country under the FAA? (b) Has the country been in default for more than one year on interest or principal on any U S loan under a program for which the FY 1989 Appropriations Act appropriates funds? No
- 11 FAA Sec 620(s) If contemplated assistance is development loan or to come from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget and amount of the country's foreign exchange or other resources spent on military equipment? (Reference may be made to the annual "Taking Into Consideration" memo "Yes, taken into account by the Administrator at time of approval of Agency OYB " This approval by the Administrator of the Operational Year Budget can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur) N/A
12. FAA Sec 620(t) Has the country severed diplomatic relations with the United States? If so, have relations been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No

- 13 FAA Sec 620(u) What is the payment status of the country's U N obligations? If the country is in arrears, were such arrearages taken into account by the A I D Administrator in determining the current A I D Operational Year Budget? (Reference may be made to the "Taking into Consideration" memo) No nation currently in arrears.
- 14 FAA Sec 620A Has the President determined that the recipient country grants sanctuary from prosecution to any individual or group which has committed an act of international terrorism or otherwise supports international terrorism? No
- 15 FY 1989 Appropriation Act Sec 568 Has the country been placed on the list provided for in Section 6(j) of the Export Administration Act of 1979 (currently Libya, Iran, South Yemen, Syria, Cuba or North Korea)? No
- 16 ISDCA of 1985 Sec 552(b) Has the Secretary of State determined that the country is a high terrorist threat country after the Secretary of Transportation has determined, pursuant to section 1115(e)(2) of the Federal Aviation Act of 1958, that an airport in the country does not maintain and administer effective security measures? No
- 17 FAA Sec 666(b) Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S who is present in such country to carry out economic development programs under the FAA? No
- 18 FAA Secs. 669, 670 Has the country, after August 3, 1977, delivered to any other country or received nuclear enrichment or reprocessing equipment, materials, or technology, without No

specified arrangements or safeguards, and without special certification by the President? Has it transferred a nuclear explosive device to a non-nuclear weapon state, or if such a state, either received or detonated a nuclear explosive device? (FAA Sec 620E permits a special waiver of Sec 669 for Pakistan)

- 19 FAA Sec 670 If the country is a non-nuclear weapon state, has it, on or after August 8, 1985, exported (or attempted to export) illegally from the United States any material, equipment, or technology which would contribute significantly to the ability of a country to manufacture a nuclear explosive device? No
- 20 ISDCA of 1981 Sec 720 Was the country represented at the Meeting of Ministers of Foreign Affairs and Heads of Delegations of the Non-Alligned Countries to the 36th General Assembly of the U S on September 25 and 28, 1981, and did it fail to disassociate itself from the communique issued? If so, has the President taken it into account? (Reference may be made to the "Taking into Consideration" memo) Most of the countries were present; none is known to have disassociated itself.
- 21 Fy 1989 Appropriation Act Sec 527 Has the recipient country been determined by the President to have engaged in a consistent pattern of opposition to the foreign policy of the United States? No
- 22 FY 1989 Appropriation Act Sec 513 Has the duly elected Head of Government of the country been deposed by military coup or decree? If assistance has been terminated, has the President notified Congress that a democratically elected government has taken office prior to the resumption of assistance? No

23 FY 1989 Appropriations Act Sec 540
Does the recipient country fully cooperate with the international refugee assistance organizations, the United States, and other governments in facilitating lasting solutions to refugee situations, including resettlement without respect to race, sex, religion, or national origin? Yes

B FUNDING SOURCE CRITERIA FOR COUNTRY ELIGIBILITY

1 Development Assistance Country
Criteria

FAA Sec 116 Has the Department of State determined that this government has engaged in a consistent pattern of gross violations of internationally recognized human rights? If so, can it be demonstrated that contemplated assistance will directly benefit the needy? No

FY 1989 Appropriation Act Sec 536
Has the President certified that use of DA funds by this country would violate any of the prohibitions against use of funds to pay for the performance of abortions as a method of family planning, to motivate or coerce any person to practice abortions, to pay for the performance of involuntary sterilization as a method of family planning, to coerce or provide any financial incentive to any person to undergo sterilizations, to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning? No

PROJECT CHECKLIST 5C(2)

Listed below are statutory criteria applicable to projects
This section is divided into two parts Part A includes
criteria applicable to all projects Part B includes the
checklist for project funded with Development Assistance B(1)
applies to all projects funded with Development Assistance

A GENERAL CRITERIA FOR PROJECT

- 1 FY 1989 Appropriations Act Sec 523, FAA Sec 634A If money is sought to obligate for an activity not previously justified to Congress, or for an amount in excess of amount previously justified to Congress, has Congress been properly notified? Yes
- 2 FAA Sec 611 (a) (1) Prior to an obligation in excess of \$500,000, will there be (a) engineering, financial or other plans necessary to carry out the assistance, and (b) a reasonably firm estimate of the cost to the U S of the assistance? Yes
- 3 FAA Sec 611 (a) (2) If legislative action is required within recipient country, what is the basis for a reasonable expectation that such action will be completed in time to permit orderly accomplishment of the purpose of the assistance? N/A
- 4 FAA Sec 611 (b), FY 1989 Appropriations Act Sec 501 If project is for water or water-related land resource construction, have benefits and costs been computed to the extent practicable in accordance with the principles, standards, and procedures established pursuant to the Water Resources Planning Act (42 U S C. 1962, et seq)? (See A.I D Handbook 3 for guidelines) N/A

- 5 FAA Sec 611(e) If project is capital assistance (e.g., construction), and total U S assistance for it will exceed \$ 1 million, has Mission Director certified and Regional Assistant Administrator taken into consideration the country's capability to maintain and utilize the project effectively? N/A
- 6 FAA Sec 209 Is project susceptible to execution as part of regional or multilateral project? if so, why is project not so executed? Information and conclusion whether assistance will encourage regional development programs This is a regional project.
- 7 FAA Sec 601 (a) Information and conclusions on whether projects will encourage efforts of the country to (a) increase the flow of international trade, (b) foster private initiative and competition, (c) encourage development and use of cooperatives, credit unions, and savings and loan associations, (d) discourage monopolistic practices, (e) improve technical efficiency of industry, agriculture and commerce, and (f) strengthen free labor unions Project is aimed at sustainable small-scale private sector development
- 8 FAA Sec 601 (b) Information and conclusions on how project will encourage U S private trade and investment abroad and encourage private U S participation in foreign assistance programs (including use of private trade channels and the services of U S private enterprise) N/A
- 9 FAA Secs 612 (b) & 636 (h) Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U S are utilized in lieu of dollars Countries receiving grants will meet a portion of costs (about 30%)

- 10 FAA Sec 612 (d) Does the U S own excess foreign currency of the country and, if so, what arrangements have been made for its release? No
- 11 FY 1989 Appropriations Act Sec 521 If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U S producers of the same, similar or competing commodity? The project will encourage exports of small volumes of high quality exports of marine products which are not likely to cause injury to U.S. producers
- 12 FY 1989 Appropriations Act Sec 549 Will the assistance (except for programs in Caribbean Basin Initiative countries under U S Tariff Schedule "Section 807", which allows reduced tariffs on articles assembled abroad from U S -made components) be used directly to procure feasibility studies, prefeasibility studies, or project profiles of potential investment in, or to assist the establishment of facilities specifically designed for, the manufacture for export to the United States or to third country markets in direct competition with U S exports, of textiles, apparel, footwear, handbags, flat goods (such as wallets or coin purses worn on the person), work gloves or leather wearing apparel? N/A
- 13 FAA Sec 119 (g) (4) - (6) & (10) Will the assistance (a) support training and education efforts which improve the capacity of recipient countries to prevent loss of biological diversity, (b) be provided under a long-term agreement in which the recipient country agrees to protect ecosystems or other wildlife Yes

habitats, (c) support efforts to identify and survey ecosystems in recipient countries worthy of protection, or (d) by any direct or indirect means significantly degrade national parks or similar protected areas or introduce exotic plants or animals into such areas?

- | | | |
|-----|--|-----|
| 14. | <u>FAA Sec 121 (d)</u> If a Sahel project, has a determination been made that the host government has an adequate system for accounting for and controlling receipt and expenditure of project funds (either dollars or local currency generated therefrom)? | N/A |
| 15 | <u>FY 1989 Appropriations Act</u> If assistance is to be made to a United States PVO (other than a cooperative development organization), does it obtain at least 20 per cent of its total annual funding for international activities from sources other than the United States Government? | Yes |
| 16 | <u>FY 1989 Appropriations Act Sec 538</u> If assistance is being made available to a PVO, has that organization provided upon timely request any document, file, or record necessary to the auditing requirements of A I D , and is the PVO registered with A I D ? | Yes |
| 17 | <u>FY 1989 Appropriations Act Sec 514</u> If funds are being obligated under an appropriation account to which they were not appropriated, has prior approval of the Appropriations Committees of Congress been obtained? | N/A |
| 18 | <u>State Authorization Sec 139 (as interpreted by conference report)</u> Has confirmation of the date of signing of the project agreement, | N/A |

including the amount involved, been cabled to State L/T and A I D LEG within 60 days of the agreement's entry into force with respect to the United States, and has the full text of the agreement been pouched to those same offices? (See Handbook 3, Appendix 6G for agreements covered by this provision)

B FUNDING CRITERIA FOR PROJECT

1 a FY 1989 Appropriations Act Sec 548 (as interpreted by conference report for original enactment) If assistance is for agricultural development activities (specifically, any testing or breeding feasibility study, variety improvement or introduction, consultancy, publication, conference, or training), are such activities (a) specifically and principally designed to increase agricultural exports by the host country to a country other than the United States, where the export would lead to direct competition in that third country with exports of a similar commodity grown or produced in the United States, and can the activities reasonably be expected to cause substantial injury to U S exporters of a similar agricultural commodity, or (b) in support of research that is intended primarily to benefit U S producers?

N/A

b FAA Secs 102(b), 111, 113, 281(a)

Describe extent to which activity will (a) effectively involve the poor in development by extending access to economy at local level, increasing labor-intensive production and the use of appropriate technology, dispersing

Project is income generation in private sector for people with very limited or no current employment.

investment from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using appropriate U S institutions, (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a better life, and otherwise encourage democratic private and local governmental institutions, (c) support the self-help efforts of developing countries, (d) promote the participation of women in the national economies of developing countries and the improvement of women's status, and (e) utilize and encourage regional cooperation by developing countries

Appropriate technologies are being used & development is non-urban outer islands. Project is privately implemented & actively involves women. Regional cooperation is a primary project outcome

c FAA Secs 103, 103A, 104, 105, 106, 120-21, FY 1989 Appropriations Act (Development Fund for Africa Does the project fit the criteria for the source of funds (functional account) being used?

N/A

d FAA Sec 107 Is emphasis placed on use of appropriate technology (relatively smaller, cost-saving, labor-using technologies that are generally most appropriate for the small farms, small businesses, and small incomes of the poor)?

Yes

e FAA Secs. 110, 124(d) Will the recipient country provide at least 25 percent of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or is the latter cost-sharing requirement being waived for a "relatively least developed" country)?

Yes, all but Kiribati which qualifies as relatively least developed.

- f FAA Sec 128(b) If the activity attempts to increase the institutional capabilities of private organizations or the government of the country, or if it attempts to stimulate scientific and technological research, has it been designed and will it be monitored to ensure that the ultimate beneficiaries are the poor majority?
- Research is aimed at protecting natural resources & expanding incomes of poor fisher groups or small-scale entrepreneurs in all countries.
- g FAA Sec 281(b) Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country, utilizes the country's intellectual resources to encourage institutional development, and supports civil education and training in skills required for effective participation in governmental processes essential to self-government
- Project designed to meet local needs & uses local human resources Countries already have high participation rates in self-government
- h FY 1989 Appropriations Act Sec 536 Are any of the funds to be used for the performance of abortions as a method of family planning or to motivate or coerce any person to practice abortions?
- No
- Are any of the funds to be used to pay for the performance of involuntary sterilization as a method of family planning or to coerce or provide any financial incentive to any person to undergo sterilizations?
- No
- Are any of the funds to be used to pay for any biomedical research which relates, in whole or in part, to methods of, or the performance of, abortions or involuntary sterilization as a means of family planning?
- No

- 1 FY 1989 Appropriations Act Is the assistance being made available to any organization or program which has been determined to support or participate in the management of a program of coercive abortion or involuntary sterilization? N/A
- If assistance is from the population functional account, are any of the funds to be made available to voluntary family planning projects which do not offer, either directly or through referral to or information about access to, a broad range of family planning methods and services? N/A
- j FAA Sec 601(e) Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise? Yes
- k FY 1989 Appropriations Act What portion of the funds will be available only for activities of economically and socially disadvantaged enterprises, historically black colleges and universities, colleges and universities having a student body in which more than 40 percent of the students are Hispanic Americans, and private and voluntary organizations which are controlled by individuals who are black Americans, Hispanic Americans, or Native Americans, or who are economically or socially disadvantaged (including women)? No set aside is planned Competition by organizations described is actively encouraged.
- 1 FAA Sec 118(c) Does the assistance comply with the environmental procedures set forth in A I D Regulation 16? Does the assistance place a high priority on conservation and sustainable management of tropical forests? Specifically, Project complies with Regulation 16. The remainder of Sec 11 B(c) is not applicable.

does the assistance, to the fullest extent feasible (a) stress the importance of conserving and sustainably managing forest resources, (b) support activities which offer employment and income alternatives to those who otherwise would cause destruction and loss of forests, and help countries identify and implement alternatives to colonizing forested areas, (c) support training programs, educational efforts, and the establishment or strengthening of institutions to improve forest management, (d) help end destructive slash-and-burn agriculture by supporting stable and productive farming practices, (e) help conserve forests which have not yet been degraded by helping to increase production on lands already cleared or degraded, (f) conserve forested watersheds and rehabilitate those which have been deforested, (g) support training, research, and other actions which lead to sustainable and more environmentally sound practices for timber harvesting, removal, and processing, (h) support research to expand knowledge of tropical forests and identify alternatives which will prevent forest destruction, loss, or degradation, (i) conserve biological diversity in forest areas by supporting efforts to identify, establish, and maintain a representative network of protected tropical forest ecosystems on a world-wide basis, by making the establishment of protected areas a condition of support for activities involving forest clearance or degradation, and by helping to identify tropical forest ecosystems and

species in need of protection and establish and maintain appropriate protected areas, (j) seek to increase the awareness of U S government agencies and other donors of the immediate and long-term value of tropical forests, and (k) utilize the resources and abilities of all relevant U S government agencies?

- m FAA Sec 118(c)(13) If the assistance will support a program or project significantly affecting tropical forests (including projects involving the planting of exotic plant species), will the program or project (a) be based upon careful analysis of the alternatives available to achieve the best sustainable use of the land, and (b) take full account of the environmental impacts of the proposed activities on biological diversity? N/A

- n FAA Sec 118(c)(14) Will assistance be used for (a) the procurement or use of logging equipment, unless an environmental assessment indicates that all timber harvesting operations involved will be conducted in an environmentally sound manner and that the proposed activity will produce positive economic benefits and sustainable forest management systems, or (b) actions which will significantly degrade national parks or similar protected areas which contain tropical forests, or introduce exotic plants or animals into such areas? No

- o FAA Sec. 118(c)(15) Will assistance be used for (a) activities which would result in the conversion of forest lands to the rearing of livestock, (b) the

construction, upgrading, or maintenance of roads (including temporary haul roads for logging or other extractive industries) which pass through relatively undegraded forest lands, (c) the colonization of forest lands, or (d) the construction of dams or other water control structures which flood relatively undegraded forest lands, unless with respect to each such activity an environmental assessment indicates that the activity will contribute significantly and directly to improving the livelihood of the rural poor and will be conducted in an environmentally sound manner which supports sustainable development?

- p FY 1989 Appropriations Act If assistance will come from Sub-Saharan Africa DA account, is it (a) to be used to help the poor majority in Sub-Saharan Africa through a process of long-term development and economic growth that is equitable, participatory, environmentally sustainable, and self-reliant, (b) being provided in accordance with the policies contained in section 102 of the FAA, (c) being provided, when consistent with the objectives of such assistance, through African, United States and other PVOs that have demonstrated effectiveness in the promotion of local grassroots activities on behalf of long-term development in Sub-Saharan Africa, (d) being used to help overcome shorter-term constraints to long-term development, to promote reform of sectoral economic policies, to support the critical sector priorities of agricultural production and natural resources, health, voluntary family planning
- N/A

services, education, and income generating opportunities, to bring about appropriate sectoral restructuring of the Sub-Saharan African economies, to support reform in public administration and finances and to establish a favorable environment for individual enterprise and self-sustaining development, and to take into account, in assisted policy reforms, the need to protect vulnerable groups, (e) being used to increase agricultural production in ways that protect and restore the natural resource base, especially food production, to maintain and improve basic transportation and communication networks, to maintain and restore the renewable natural resource base in ways that increase agricultural production, to improve health conditions with special emphasis on meeting the health needs of mothers and children, including the establishment of self-sustaining primary health care systems that give priority to preventive care, to provide increased access to voluntary family planning services, to improve basic literacy and mathematics especially to those outside the formal educational system and to improve primary education, and to develop income-generating opportunities for the unemployed and underemployed in urban and rural areas?

q FY 1989 Appropriations Act Sec 515 If deob/reob authority is sought to be exercised in the provision of DA assistance, are the funds being obligated for the same general purpose, and for countries within the same general

N/A

region as originally obligated,
and have the Appropriations
Committees of both Houses of
Congress been properly notified?

STANDARD ITEM CHECKLIST 5C(3)

Listed below are the statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by imposing limits on certain uses of funds

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions

A PROCUREMENT

- 1 FAA Sec 602(a) Are there arrangements to permit U S small business to participate equitably in the furnishing of commodities and services financed? Yes
- 2 FAA Sec 604(a) Will all procurement be from the U S except as otherwise determined by the President or determined under delegation from him? Yes
- 3 FAA Sec 604(d) If the cooperating country discriminates against marine insurance companies authorized to do business in the U S , will commodities be insured in the United States against marine risk with such a company? N/A
- 4 FAA Sec 604(e), ISDCA of 1980 Sec 705(a). If non-U S procurement of agricultural commodity or product thereof is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? (Exception where commodity financed could not reasonably be procured in U S) N/A

- 5 FAA Sec 604(g) Will construction or engineering services be procured from firms of advanced developing countries which are otherwise eligible under code 941 and which have attained a competitive capability in international markets in one of these areas? (Exception for those countries which receive direct economic assistance under the FAA and permit United States firms to compete for construction or engineering services financed from assistance programs of these countries) No
- 6 FAA Sec 603 Is the shipping excluded from compliance with the requirement in section 901(b) of the Merchant Marine Act of 1936, as amended, that at least 50 percent of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U S flag commercial vessels to the extent such vessels are available at fair and reasonable rates? No
- 7 FAA Sec 621(a) If technical assistance is financed, will such assistance be furnished by private enterprise on a contract basis to the fullest extent practicable? Will the facilities and resources of other Federal agencies be utilized, when they are particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs? Yes
- 8 International Air Transportation Fair Competitive Practices Act, 1974 If air transportation of persons or property is financed on grant basis, will U S carriers be used to the extent such service is available? Yes

- 9 FY 1989 Appropriations Act Sec 504
If the U S Government is a party to a contract for procurement, does the contract contain a provision authorizing termination of such contract for the convenience of the United States? Yes
- 10 FY 1989 Appropriations Act Sec 524
If assistance is for consulting service through procurement contract pursuant to 5 U S C 3109, are contract expenditures a matter of public record and available for public inspection (unless otherwise provided by law or Executive order)? Yes
- B CONSTRUCTION**
- 1 FAA Sec 601(d) If capital (e g , construction) project, will U S engineering and professional services be used? N/A
- 2 FAA Sec 611(c) If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? Yes
- 3 FAA Sec 620(k) If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U S not exceed \$100 million (except for productive enterprises in Egypt that were described in the CP), or does assistance have the express approval of Congress? N/A
- C OTHER RESTRICTIONS**
- 1 FAA Sec 122(b) If development loan repayable in dollars, is interest rate at least 2 percent per annum during a grace period which is not to exceed ten years, and at least 3 percent per annum thereafter? N/A

- 2 FAA Sec 301(d) If fund is established solely by U S contributions and administered by an international organization, does Comptroller General have audit rights? N/A
- 3 FAA Sec 620(h) Do arrangements exist to insure that United States foreign aid is not used in a manner which, contrary to the best interests of the United States, promotes or assists the foreign aid projects or activities of the Communist-bloc countries? N/A
- 4 Will arrangements preclude use of financing
- a FAA Sec 104(f), FY 1989 Appropriations Act Secs 525, 536 (1) To pay for performance of abortions as a method of family planning or to motivate or coerce persons to practice abortions, (2) to pay for performance of involuntary sterilization as method of family planning, or to coerce or provide financial incentive to any person to undergo sterilization, (3) to pay for any biomedical research which relates, in whole or part, to methods or the performance of abortions or involuntary sterilizations as a means of family planning, or (4) to lobby for abortion? Yes
- b FAA Sec 483 To make reimbursements, in the form of cash payments, to persons whose illicit drug crops are eradicated? Yes
- c FAA Sec 620(g) To compensate owners for expropriated or nationalized property, except to compensate foreign nationals in accordance with a land reform program certified by the President? Yes

- d FAA Sec 660 To provide training, advice, or any financial support for police, prisons, or other law enforcement forces, except for narcotics programs? Yes
- e FAA Sec 662 For CIA activities? Yes
- f FAA Sec 636(1) For purchase, sale, long-term lease, exchange or guaranty of the sale of motor vehicles manufactured outside U S , unless a waiver is obtained? Yes
- g FY 1989 Appropriations Act Sec 503 To pay pensions, annuities, retirement pay, or adjusted service compensation for prior or current military personnel? Yes
- h FY 1989 Appropriations Act Sec 505 To pay U N assessments, arrearages or dues? Yes
- i FY 1989 Appropriations Act Sec 506 To carry out provisions of FAA section 209(d) (transfer of FAA funds to multilateral organizations for lending)? Yes
- j FY 1989 Appropriations Act Sec 510 To finance the export of nuclear equipment, fuel, or technology? Yes
- k FY 1989 Appropriations Act Sec 511 For the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the Universal Declaration of Human Rights? Yes

- 1 FY 1989 Appropriations Act Sec 511 For the purpose of aiding the efforts of the government of such country to repress the legitimate rights of the population of such country contrary to the University Declaration of Human Rights? Yes
- 5 FY 1989 Appropriations Act Sec 584 Will any A I D contract and solicitation, and subcontract entered into under such contract, include a clause requiring that U S. marine insurance companies have a fair opportunity to bid for marine insurance when such insurance is necessary or appropriate? Yes

ANNEX D

HOST GOVERNMENT REQUESTS FOR ASSISTANCE



Telephone 28-721
Telex RG 62006

GOVERNMENT OF THE COOK ISLANDS



Ministry of Marine Resources
P.O. Box 85
RAROTONGA, COOK ISLANDS

ACTIC I

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14 August 1989
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8/18

Mr. John Woods
Regional Director
United States Agency for
International Development
American Embassy
P O Box 218
Suva
FIJI

Dear John, -

re: PEARL OYSTER DEVELOPMENT PROJECT - COOK ISLANDS

I am writing to formally request development assistance from your Government to the Cook Islands Government, for pearl oyster development in our northern group islands. This request is being made under your Government's Pacific Islands Marine Resources Project - 879 - 0020

Your Government's assistance in the past, through the Small Island Country assistance programme, has been of major impact to the development of fisheries in the Cook islands. The assistance provided under this programme to the initial development of the black-lipped pearl culture industry in the Cook Islands has largely been instrumental in paving the way for greater participation in this area by the indigenous populations of these remote atolls

I would like to take this opportunity to thank your Government for its timely and much appreciated assistance in the area of pearl culture development in the Cook Islands and look forward to your continued assistance in this area

Yours sincerely

J. Dashwood
J. Dashwood
SECRETARY

D-1



MINISTRY OF FOREIGN AFFAIRS

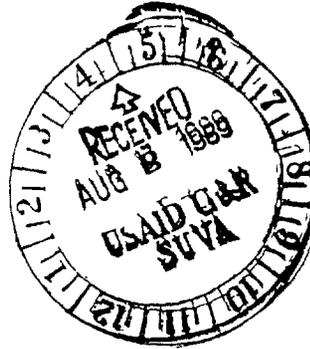
P O Box 68 BAIKIKI TARAWA
REPUBLIC OF KIRIBATI

Cable: FORMIN TARAWA

Our Ref FA 13/15

Date:
8 August 1989

Mr John B Woods
Regional Director
USAID
Suva
FIJI



Dear Mr Woods

I am writing to follow up the various consultations between the Government of Kiribati and your office and particularly the recent visit of your officials from 22-27 July 1989, concerning A I D Project Number 879-0020

I now write to convey a formal request from the Government of Kiribati to be included in the overall Regional AID Project Number 879-0020, The USAID Pacific Islands Marine Resources Project and in particular, the Kiribati Applied Atoll Research for Development component which specifically applies to Kiribati

As discussed with your officials, a definitive project document and proposal will be prepared and submitted to USAID on completion. Meanwhile, I would appreciate your assistance in advising this office of any further developments on Project No 879-0020

Yours sincerely

M BAARO (Mrs)
for Secretary for Foreign Affairs

ACTION	INFO
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DUE DATE	8/10
ACTION TAKEN	

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DEPARTMENT OF FINANCE AND PLANNING

TELEGRAMS: FINANCE
 TELEX: 22218
 FACSIMILE: 213826

POST OFFICE
 HARDS STRIP
 PAPUA NEW GUINEA

10 August 1989

D Devine

The Ambassador
 Embassy of the
 United States of America
 P O Box 1492
Port Moresby

Attn Mr Louis H Kuhn
Assistant Director
 U S Agency for International Development

SUBJECT REQUEST FOR USAID ASSISTANCE FOR SMALL SCALE
FISHERIES DEVELOPMENT IN PAPUA NEW GUINEA

The Department of Finance and Planning in consultation with the Department of Fisheries and Marine Resources have considered the joint proposal on a programme of Small Scale Fisheries Development and are in agreement with the objectives, scope and proposed implementation plan

We hereby formally request USAID for assistance in funding the project

Yours sincerely

Fiu Williams (Ms)
Assistant Secretary
 Bilaterals Programme Branch
 Foreign Aid Management Division

ANNEX E

COUNTRY ANALYSES

SOURCE SELECTION INFORMATION --- SEE FAR 3 104

ANNEX E

COUNTRY ANALYSES

Each country component is described separately in this annex to allow RDO/SP to use these as stand alone documents for discussion with the individual countries, as each will sign a Project Agreement with A I D The component descriptions include 1) background, 2) objectives, 3) individual logical framework, 4) project elements, 5) sustainability considerations (fisheries development, economic viability, beneficiary or institutional issues), 6) implementation issues (government, RDO/SP, contracting or cooperating organizations), 7) key activities to be monitored, 8) potential impact of project and 9) a complete detailed budget

The main project paper text represents a synthesis of these components and ties in the regional and overall project development and implementation issues

Components are presented alphabetically in this order

- Cook Islands
- Kiribati
- Papua New Guinea
- Tonga
- Tuvalu

In preparation for the PP design, contracts were let to prepare specific technical proposals for each country component Further details, especially equipment lists, are included in these reports which are

<u>COUNTRY</u>	<u>AUTHOR(S)</u>	<u>DATE</u>
Cook Islands	H Sperling	March, 1989
Kiribati	Brewer, Brandman Associates P Milone	July, 1989
Papua New Guinea	J Crossland, M Morrissey S Salla	July, 1989
Tonga	H Sperling	July, 1989
Tuvalu	H Sperling	June, 1989

ANNEX E

COUNTRY COMPONENT

KIRIBATI

I BACKGROUND AND RATIONALE

Kiribati is made up of 33 tiny atolls dispersed along the equator. The country consists of three island groups: the Gilbert Islands to the west which includes Tarawa, the line islands some 3,000 km to the east, and lying about halfway between is the Phoenix Group. These atolls rarely rise more than five meters above sea level, and constitute a total land area of only 746 square kilometers, widely dispersed over three million kilometers of ocean.

In the South Pacific, customary practices have traditionally maintained a balance between subsistence needs of communities and availability of resources. This balance is increasingly threatened by commercial exploitation of marine resources, introduction of more powerful fishing technologies, growing population pressure, shore development, and urbanization. In some areas, yields of reef and lagoon resources have already been reduced by over-fishing. In other areas, yields are being reduced due to deterioration of the marine environment from causeway construction, groundwater extraction, mangrove destruction, land reclamation, sand quarrying, resort development, sewage and solid waste disposal. In the long-term, marine resource management and marine environmental issues will become central to development planning for all island communities as the effects of social and economic development press more closely against the limits of complex and fragile tropical marine ecosystems. Practical and systematic knowledge is needed on living and non-living natural resources and on the impact that different development alternatives might have on their sustainable development and management. Nowhere are these needs for applied ecological research more pressing than in the land-scarce, sea dependent atoll countries of the Pacific.

The Republic of Kiribati is one such atoll country experiencing the effects of high population densities, limited natural resources and the fragile nature of the atoll ecosystem. Problems of increased fishing pressure, extensive causeway development, and diminished water quality are most striking on South Tarawa, the capital of Kiribati, where the

population has doubled in the last ten years. Related to increasing population densities, scarce resources, and inappropriate utilization of such resources, there are rapidly increasing incidences of malnutrition, nutrition-related diseases, depletion of marine food species, and increased reliance on imported foods. Kiribati, as the world's largest atoll nation, with its central location among other atoll nations, and its development experience being representative of that encountered by many other atoll countries, has been selected as the starting point for applied atoll ecological research. Further, Tarawa lagoon provides a setting of heavy urbanization in South Tarawa and an area of continued rural/subsistence lifestyle in the north, which is very conducive to comparative studies of lagoon marine environments. Located on South Tarawa is the Atoll Research Development Unit (ARDU) of the University of the South Pacific (USP), established in 1979 to respond to many of the research needs of atoll countries described above. With staffing and material assistance, the ARDU provides an ideal institutional base from which to carry out a program of atoll marine research.

II. PROJECT OBJECTIVES

The goal of all components of the Pacific Island Marine Resources project, like that of each of the ten bilateral country programs of RDO/SP, is the same as the basic goal of the RDSS to increase income opportunities for men and women within the Pacific Islands through means which enhance the conservation and management of natural resources.

The national purpose of the Kiribati component is to undertake applied atoll research leading to formulation of management strategies for the marine resources of the Tarawa lagoon. These management strategies will focus on the conservation and sustainable exploitation of the primary food sources of the lagoon. The project will complete a three-year finfish and shellfish stock assessment program, a two-year monitoring program of lagoon water-quality, circulation and water exchange systems, and will develop management strategies to reduce over-fishing and degradation of the lagoon ecosystem encompassing land-based development, commercial and subsistence fishing.

The regional purpose is to demonstrate replicable strategies for managing atoll marine resources based on applied research which can be used by other Pacific Island nations with atolls to conserve and develop their natural resources.

FIGURE E 2 LOGICAL FRAMEWORK KIRIBATI

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROGRAM OR SECTOR GOAL</u>	<u>MEASURE OF GOAL ACHIEVEMENT</u>		
Increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation of natural resources	Improved or sustainable yields from Tarawa's shellfish and finfish fisheries	1a Fishery catch and effort data by the GOK Fisheries Division 1b Discussions with community by post project impact evaluation team	GOK will take prompt action to conserve and manage natural resources
<u>COMPONENT PURPOSE</u>	<u>END OF PROJECT STATUS</u>		
1 The <u>national</u> purpose is to undertake applied atoll research leading to formulation of management strategies for the marine resources of the Tarawa lagoon 2 The <u>regional</u> purpose is to devise replicable strategies for managing atoll marine resources based on applied research	Management strategies are devised for significant percentage of the total value of the annual catch or the number of heavily exploited types of marine resources	1 Contractor reports quantity importance of recommended management strategies using project and GOK Fisheries Division catch and effort data 2 Enactment of GOK policy statutory or regulatory initiatives directed toward marine resource management	Applied research can be completed and management strategies formulated within five years

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
1 Assessment of shellfish and finfish stock size, reproductive biology and habitat requirements	1 Three year finfish and shellfish stock assessment program focusing on primary food sources of the lagoon such as <u>Anadara</u> (shellfish) <u>Albulids</u> (bonefishes) and <u>Lethrinids</u> (emperorfishes)	1 Semi annual progress reports by marine biologist and benthic ecologist	1 Subsistence fisheries community will implement new fishing practices
2 Determination of the impact on marine resource yields and the lagoon ecosystem of land based activities such as causeway construction and sewage disposal	2 Two year lagoon monitoring program of water quality circulation and tidal exchange systems involving monthly measurement of bacteriological, chemical and physical parameters at 10 12 sites encompassing the entire lagoon	2 Semi annual progress reports by oceanographer and microbiologist	
3 Development of marine resources management strategies based on the result of applied research and policy dialogue with the GOK	3 Management strategies formulated encompassing land based development commercial and subsistence fisheries	3 Semi annual and special reports by university coordinator	

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<u>INPUTS</u>		<u>A I D GOK/USP</u>		
<u>A I D</u>	Type of Input	(\$000)		
Short term T A benthic ecologist, oceanographer fisheries scientist marine microbiologist, economist and cartographer, Local long-term staff marine ecologist, Research Assistant, 2 Field Assistants, Commodities including laboratory equipment and supplies laboratory services and publication	Short term T A	605		1 A I D records
	Local Long term T A	202	132	2 Contractor progress reports and studies
	Admin/Operating Costs	20		3 Contracts and cooperating agreements
	Commodities	70		
	Facilities		80	
	Other	75		
	Total	972	212	

GOK/USP Long term counterpart staff, building improvements and equipment

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III. PROJECT ELEMENTS

Implementation of the project will involve a five-year contract to be awarded to a U S university to oversee a series of short-term technical assistance missions and a small, locally-hired full-time staff. Key outputs of the project will include

- 1) Assessment of shellfish and finfish stock size/relative abundance (between heavily exploited South Tarawa and lightly fished North Tarawa), and habitat,
- 2) Determination of the impact on marine resource yields and the lagoon ecosystem of land-based activities such as causeway construction, mangrove destruction, and sewage disposal, and,
- 3) Development of marine resources management strategies based on the results of the applied research and policy dialogue with the Government of Kiribati (GOK)

The shellfish stock assessment program proposed for Tarawa lagoon involves a three-year effort of field sampling, data collection, laboratory analysis, and interpretative analysis. The services of a benthic ecologist will be required on a short-term basis to design and institute the shellfish research. Shellfish field research calls for collection of bottom biota samples approximately four times a year for two years along eight or more transect sites evenly divided between heavily exploited South Tarawa and lightly fished North Tarawa by quantitative means. Lagoon bed sedimentation samples would be collected less frequently, perhaps twice a year along the transect sites, and more frequently near pollution point-sources. Continuous field sampling over the first two years would be carried out by the project-funded full-time staff following guidance and training by the benthic ecologist. Shellfish samples collected, identified, recorded, measured, weighed, and reproductive state determined will be subject to periodic laboratory analysis as needed, and would provide the database for summary analyses by the benthic ecologist in the third year of the stock assessment program. In addition, major benthic organisms obtained by quantitative sampling would also be identified and added to the database, with special effort toward identification of pollution indicator organisms (e.g. certain polychaete worms).

Potential shellfish resource management strategies derived from the stock assessment program include establishment of reserves for important breeding stocks, control of shellfish collection activity during peak spawning periods, control of the take of undersized shellfish, or establishment of a rotational harvesting program to allow heavily exploited areas to recover

The finfish stock assessment also involves a three-year effort of field sampling, data collection, laboratory and interpretative analysis. The services of a fisheries scientist would be required to design and direct the finfish stock assessment, with continuous field sampling carried out by full-time project staff. Research sites would be established at selected locations in the lagoon evenly divided between North and South Tarawa, partially randomized and including known spawning areas and fishing grounds. One research site would be sampled each week on a rotational basis to account for changes in seasonal and tide state. Choice of appropriate gear, such as gill nets, traps, handlines, etc. would be made by the fisheries scientist, considering its suitability as the standard for future surveys to allow development of time-series data. Up to four research sites would also be established outside of the lagoon for comparison purposes. Finfish samples collected, recorded, measured, weighed and sexed would provide a database for biological analyses by the fisheries scientist directed toward the formulation of management strategies in the third year of the stock assessment program.

A survey of South Tarawa residents is proposed to document traditional resource use patterns to support the design of both the shellfish and finfish stock assessment programs. The services of an economist, assisted by three locally-hired community development workers to serve as survey enumerators and data collators, would be required to carry out the survey. The survey, based on household interviews of a 2% sample of the three largest villages on South Tarawa, would document local knowledge of the primary food sources of the lagoon, shellfish collection and fishing practices, spawning grounds, and village ownership/authority over adjacent shellfish beds. A preliminary survey would be conducted under the direction of the economist to develop required instrumentation, sampling scheme, and data compilation procedures. The full survey would be conducted over a ten month period by the survey enumerators under the guidance of the full-time Marine Resource Advisor. Analysis of survey results would be completed by the economist late in the second year of the project.

Water quality and circulation data will be collected over a two-year period. This will contribute to the shellfish and finfish research as well as to the determination of the impact on the lagoon ecosystem of land-based activities. Research on circulation and tidal exchange systems will be undertaken to complement A I D A B -funded research focusing on engineering criteria for the proposed North Tarawa causeway. Research on water-quality will be coordinated with proposed bacteriological monitoring by the Ministry of Health and a reef ecology program related to ciguatera (fish poison) research proposed by an Australian university.

Monitoring of chemical and physical parameters of the lagoon, such as pH, salinity, dissolved oxygen, turbidity, suspended solids, tides, and currents, will require the services of an oceanographer. Biological monitoring focusing on coliformbacterial MPN (most probable number) counts and other rapid reconnaissance techniques of water-quality measurement, will require the services of a marine microbiologist. The oceanographer and marine microbiologist would collaboratively design and institute a program of water sample collection to be carried out by the full-time project staff. Water samples would be collected on a monthly basis at from ten to twelve sites in the Tarawa lagoon. Water samples would be collected for the same stations used for benthic studies, where appropriate. Current meter measurements would be taken once every three months over the two-year period.

The services of a cartographer is proposed to assist in the documentation of research findings. This would involve the development of an aerial photo overlay base map and graphic presentation of relevant natural resource information. Such a graphic display would assist the ARDU in the future development of a coastal resources atlas and would aid policy makers and others in understanding the issues involved in atoll research conservation and management.

Short-term technical assistance personnel would be managed by a marine ecologist appointed by the Contractor, who would be designated as team leader. The level-of-effort in person-months and approximate timing of field work proposed for short-term technical assistance is as follows:

<u>U S -based Short-Term Technical Assistance</u>	<u>1990</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>No of Trips</u>
	(Person-Months)					
Benthic Ecologist		3	3	3		6
Oceanographer		3	3	3		6
Fisheries Scientist		3	3	3		6
Marine Microbiologist		3	3	3		6
Economist		3				2
Cartographer				2		1

Full-time staffing arrangements include A I D -funded and GOK seconded project staff under the supervision of a Marine Resource Advisor, and USP full-time staff managed by the ARDU Director. Full-time staff available to support technical assistance personnel include the following:

<u>Position</u>	<u>Funding Source</u>
Director	USP
Marine Resource Advisor	A I D
Research Assistant	A I D
2 Graduate-Level Assistants	GOK
2 Field Assistants	A I D
Laboratory Technician	USP
Typist	USP

Equipment budgeted for the project will involve field, laboratory and office equipment for the basic research requirements. Final balance will be left to the Contractor, but suggested lists are held at RDO/SP and are set out in the Kiribati Contractor's Report.

IV. LONG-TERM SUSTAINABILITY CONSIDERATIONS

The most critical impediment to strengthening national capacity to continue applied atoll research and management in Kiribati is the lack of human resources, and government reticence to incur recurrent costs without readily identifiable

immediate impact. A few senior officials are keenly aware of the need to make informed decisions on causeway construction, land reclamation, and exploitation of marine resources, yet the GOK lacks operating funds and qualified marine scientists to make a major commitment to the ARDU or A I D -funded research activities. The Fisheries Division has authorized positions for only two Senior Fisheries Officers and seven Assistant Fisheries Officers, for which only four positions are budgeted. Senior Fisheries Officer positions are filled by relatively inexperienced personnel. Lack of USP funding for ARDU has led to inadequate demonstration of the potential relevance of applied research in natural resource management and the promotion of sustainable marine resources development.

By focusing on the policy implications of managing the primary food sources of the lagoon, and by avoiding overly sophisticated research techniques, the project has the potential for credibly demonstrating the relevance of applied research in guiding development decision-making. The transfer of research expertise to I-Kiribati individuals capable of continuing applied research beyond project completion will require emphasis of on-the-job training of USP and GOK staff by the short-term technical assistance personnel, and further collaboration with other donors by RDO/SP to support ARDU-based applied research.

The Kiribati component has been designed as a self-contained project focusing on the formulation of replicable marine resource management strategies based on applied research, reflecting the level of resources available and the strengths of U S assistance capabilities. Other donor interest in applied atoll research sited in Kiribati is high, although their assistance activities are as yet undefined. RDO/SP will continue to work closely with other donors active in the region, especially A.I D A.B and JICA, to pursue opportunities to support human resources development, and complement project activities.

V. ISSUES FOR PROJECT IMPLEMENTATION

The primary role of the GOK will be to provide policy guidance and support for human resources development. Specific GOK tasks include.

- 1) Participation in the setting of marine resource research priorities through the ARDU Advisory Committee,

- 2) Review of alternative management strategies and support in the formulation of recommendations, and,
- 3) Secondment of GOK personnel for two graduate assistant positions

GOK advocacy of continued USP support for the ARDU would contribute to the sustainability of applied atoll research studies sited in Kiribati

Crucial to project success will be the ability of the contractor to focus on the generation of scientific information needed for policy guidance and to avoid overly academic or inappropriate research designs. Demonstrated experience in applied marine research is essential as well as clear delineation in work plans of the process for moving from findings (field sampling data), conclusions (analysis), to recommendations (alternative strategies for marine resource management)

The primary role of USP is to continue ARDU staffing at its authorized levels throughout the life of the project and complete building improvements requested by the ARDU Director prior to implementation of the project component

VI. KEY ACTIVITIES TO BE MONITORED

In instituting the finfish, shellfish, and lagoon monitoring programs, a key activity will be in developing field sampling and cataloging procedures that can be carried out on a continuous basis by available full-time staff. This will require coordination in transect site selection, sample collection scheduling, training of I-Kiribati personnel, and avoidance of overly sophisticated research techniques

In interpreting the field sample data, a key activity will be establishing relationships between species size, composition, abundance, and habitat requirements with traditional resource use patterns of the I-Kiribati. This will require basing research designs on the findings of the

community survey, establishing analysis plans that focus on biological characteristics most pertinent to marine resource management, and devising work plans that specify the kinds of inferences needed from field sampling data to formulate marine resource management strategies

In presenting recommended management strategies, a key activity will be in estimating the potential gains of alternative approaches in terms of improved or sustainable yields. This will require quantification of the impact of management strategies in such terms as projected volume of catch, the value of annual catches, species mix, depletion levels, and consumption requirements of the community

VII. POTENTIAL IMPACT OF PROJECT

The project will assist Kiribati to reduce over-fishing and slow or prevent further degradation of the lagoon ecosystem, leading to improved or sustainable yields for commercial and subsistence fisheries. At the regional level, the project will document the impact of unwise resource use and develop replicable strategies for conserving and managing scarce marine resources. It will be especially pertinent for application to other lagoons, both atoll lagoons and fringing lagoons of high islands under stress from increased urbanization

VIII. COUNTRY COMPONENT BUDGET

Table E-3 sets out the proposed budget for the Kiribati country component based on levels of effort set out in Section III, above. Table E-4 sets out the proposed contribution by GOK and USP

Table E-3

Detailed Estimates of A I D Costs Kiribati

			1990	1991	1992	1993	1994	Total LOP	
			(\$000)						
1	Technical Assistance (1)								
		<u>Person</u> <u>Months</u>							
		<u>Trips</u>							
	a) U S Short-term								
	Marine Ecologist(2)			30	31	32	33	126	
	Benthic Ecologist	9	6	34	34	34		102	
	Oceanographer	9	6	34	34	34		102	
	Fisheries Scientist	9	6	34	34	34		102	
	Marine Microbiologist	9	6	34	34	34		102	
	Economist	3	2	34				34	
	Cartographer	2	1			22		22	
	Total	41	27	200	167	190	33	590	
	b) Local Long-term								
	Marine Resource								
	Advisor	48		32	34	36	38	140	
	Research Assistant	48		10	10	11	11	42	
	Field Assistants	96		5	5	5	5	20	
	Total	192		47	49	52	54	202	
	c) Local Short-term								
	3 Survey Enumerators			15				15	
	d) Admin/Operating Costs								
	Materials/Communications			5	5	5	5	20	
2	Commodities								
	Scientific Eqpt/Materials			40	10	10		60	
	Office Equipment			8	2			10	
	Total			48	12	10		70	
3	Other								
	Publications				5	10	10	25	
	Laboratory Services				15	10	10	35	
	Donor Coordination Conference			15				15	
	Total			15	20	20	20	75	
	Component Total			0	330	253	277	112	972

NOTES

(1) See Annex G (Section IV) for technical assistance cost rates

(2) Assumes university Marine Ecologist/Team Leader terms

Salary	65,000
Overhead 50%	<u>33,000</u>

98,000

Project requires 20 per cent of Coordinators time so annual cost is \$20,000 per year, plus two 2 week trips per year at \$3500 per trip, plus \$3000 per year communications, with salary increased at five per cent per year

Table E-4

	Estimated Host Country Contribution Kiribati					Total LOP
	1990	1991	1992	1993	1994	
	(\$000)					
1 Long-term Counterpart						
Director ARDU (USP) (1)	8	8	8	8	8	40
Graduate Assistants (GOK) (2)	7	14	14	14	7	56
Secretary (USP) (3)	2	2	2	2	2	10
Technician (USP) (4)	4	6	6	6	4	26
Sub Total	21	30	30	30	21	132
2 Facilities						
Vessels and Gear	10					10
Renovations	20					20
Offices and Equipment	10	10	10	10	10	50
Sub Total	40	10	10	10	10	80
Component Total	61	40	40	40	31	212

NOTES

- (1) Assumes 50 per cent of time of Director of ARDU
- (2) Two graduate assistants at \$7,000 per year including fringe benefits
- (3) Secretary half-time at \$4,000 per year including fringe benefits
- (4) Technician full time at \$6,000 per year including fringe benefits
- (5) Based on equivalent rental for two houses in Tarawa, \$4,000 per year each, plus allowance for office equipment \$2,000 per year, total \$10,000 per year

ANNEX E

COUNTRY COMPONENT

PAPUA NEW GUINEA

I BACKGROUND AND RATIONALE

Papua New Guinea (PNG) comprises the eastern half of the large island of New Guinea and a number of some 600 large and small offshore islands. It lies between 2 and 10 degrees south latitude and 141 and 154 degrees east longitude. The total area is 463,000 sq km of which the mountainous mainland makes up about 400,000 sq km. In the west, the country shares a land boundary with the Indonesian province of Irian Jaya, sea borders are shared with Australia, Solomon Islands and the Federated States of Micronesia. The Declared Fisheries Zone (DFZ) covers 2.3 million sq km, making it the third largest in the Pacific Islands region.

Papua New Guinea, which has been independent since 1975, has a democratic, federal system of government with a national government and 19 provincial governments. The country has an enormous diversity of cultures and customs and its estimated 3.5 million people speak some 700 different languages. Almost 85% of the population is engaged in subsistence agriculture. The cash economy is based on agriculture, forestry, mining and some manufacturing. Gross domestic product was estimated at \$2.89 billion in 1986.

The commercial fisheries sector is comprised of a limited number of fisheries, with significant exports of prawns (shrimp), lobsters, fish and shell (trochus, green snail, pearl shell). A large number of foreign tuna vessels are licensed to fish the DFZ, including U.S. vessels under the multi-lateral treaty ratified in 1988. Subsistence fishing varies in PNG, but in most areas is at low levels as is small-scale commercial fishing.

Fisheries development is administered by the Department of Fisheries and Marine Resources (DFMR) at the national level, and in the provinces by divisions of provincial departments (usually the Department of Primary Industry).

Small-scale fishing can play a vital role in increasing employment and incomes, improving nutrition, and developing self reliance among coastal peoples. In addition, it

encourages the transfer of technical and business skills to the private sector. Despite the considerable socio-economic benefits that can be derived from small-scale fisheries development there are difficulties in achieving this potential, and these have held back the sub-sector in PNG. However, recent initiatives have been taken to change direction in government fisheries policy, and to place greater emphasis on the development of appropriate boats, infrastructure, catching techniques and technical assistance for village level fishing. This project seeks to reinforce this process.

The project will target on nearshore resources, including reef fishes in the outer reef zone, deep water bottomfishes on nearshore slopes, and coastal pelagic species.

Coastal pelagic species are under-exploited and offer an opportunity for an alternative fishery. Fish aggregating devices (FADs) established at selected locations will be used to improve catch per unit effort and make trolling, vertical and surface longlining more cost effective.

Reef fish stocks remain relatively underfished, but have exhibited some impact on selected areas, not, however, at the selected project sites.

A major sector review was conducted in 1988 (FAO/UNDP, 1988, final report January, 1989), which presents the most recent and concise analysis of the PNG fisheries sector. It presents potential yields by area for reef and slope areas, citing tradition and technical constraints as the major impediments to development, along with marketing. For PNG overall, it presents sustainable yield figures as

	Estimated Present Production	Potential Yield
	(metric tons)	
Reef and Lagoon	10,000	150-300,000
Deepwater (esp snapper)	negligible	1,500-2,000
Coastal Pelagics	2,000	100-150,000

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The three sites selected for the project (Lae, Madang, Rabaul) are considered representative of PNG and the above estimates. Therefore, with proper consideration for social constraints and marketing potential, the resource potential exists. To verify this, long term technical assistance in stock assessment and a PNG-DFMR commitment to vessel time for initial resource assessment are essential elements of the project. Data analysis, including enhanced species identification training, are included. Verification of potential, with follow-on stock monitoring are essential elements for sustainability.

The demand for fishery products is high in PNG. Both fresh and frozen fish command good prices at the wholesale and retail level. At present the marketing infrastructure is largely undeveloped throughout the country. Coastal fish caught by local fishing operators are both distributed among wider family members for domestic use and sold at the market level. If fishing operators were located near towns of moderate size, fish may be sold at the landing points to consumers or middlemen, or at open-air markets. The latter type of marketing is normally undertaken by the women members of the group.

Past policy in coastal fisheries development aimed at establishing fish processing plants in areas with major fish resources, which were often distant from major market centers. The infrastructure required to collect, freeze and transport fish to markets from these centers was substantial and recurrent costs were high. The quality of fish was poor and high recurrent costs which were increasingly passed on to fish suppliers as government subsidies were halted reduced prices to fish suppliers and caused supply to fall.

II. PROJECT OBJECTIVES

The purpose of the Papua New Guinea component is to expand production and consumption of locally caught fish.

The strategy to achieve this purpose is based on encouraging increased production of fresh iced fish from areas adjacent to population centers. The strategy aims to encourage private fishermen to market better quality fish directly to consumers and fish merchants. There is a powerful economic rationale to this strategy in the PNG situation where the prices

FIGURE E 3 LOGICAL FRAMEWORK PAPUA NEW GUINEA

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROGRAM OR SECTOR GOAL</u>	<u>MEASURE OF GOAL ACHIEVEMENT</u>		
To increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation and management of natural resources	Increase in incomes from coastal fishing	1 DFMR survey data on participation in coastal fisheries and fishing incomes 2 Baseline studies on target areas	Locally caught fish is competitive with imported frozen fish and other food products
<u>COMPONENT PURPOSE</u>	<u>END OF PROJECT STATUS</u>		
The <u>national</u> purpose is to expand consumption and production of locally caught fish	1 A strategy for improved fish production, marketing and resource management has been developed 2 If results have been positive a transfer of expertise and technology to both the public and private sector will be on going during the last two years of the project 3 Fish production in the project area will have expanded by 200 tons and increased value of local fish sales by \$500 000 per year 4 The catch levels are sustainable as defined by project results	1 Published project reports on pilot and ongoing phases 2 DFMR survey data on coastal fisheries catches in project locations 3 DFMR fish marketing data on sales values and volumes 4 GPNG data on volumes of lending for coastal fisheries	1 Fishery resources are adequate to sustain increased catches 2 Private disposable income levels sustain local demand for fish in main centers

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
1 Findings on, the applicability of strategies for small-scale fisheries development, the viability coastal fisheries production and marketing, and availability of fishing resources in coastal waters of PNG	1 Findings on test results available after four years	1 Project reports	1 Village fisher people participate in training and work in coastal fishing, boat building and fish marketing
2 Expanded private sector coastal fishing and fish marketing operations	2 30 existing small vessels being more productively used by EOP, 20 new vessels operating by EOP	2 DFMR survey data on numbers of vessels operating boat yard production and fish marketing operations	2 Private boatbuilders fish marketing and fishing operators are willing to invest in coastal fisheries enterprises
3 Expanded private sector small-scale boat building industry	3 Boatbuilding operations strengthened or established by EOP	3 DFMR reports on coastal fisheries resources	3 Credit is available for investment in small scale coastal fishing boat building and fish marketing
5 Strengthened programs of fisheries resource assessment and conservation at national and provincial levels	4 resource assessment studies completed and reported (Quantities to be confirmed by the planning phase)		4 Qualified provincial and national government technical staff are available to support project and data collection

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<u>INPUTS</u>			
A I D	Type of Input	A I D (\$000)	GPNG
14 5 years of long term T A (fisheries development advisor, scientist, marketing specialist senior fishing specialists), 23 months of short term T A , one two year M S training program, work shops a fish marketing study tour and 4 small boats, fishing gear and trial ice makers	Long term T A	2096	468
	Short term T A	378	
	Admin/Operating Costs	165	
	Training	215	
	Commodities	238	150
	Research vessels		240
	Facilities		556
	Other		
	Total	3092	1414
GPNG Counterpart staff research vessel time, fish marketing facilities, workshop accommodation office support			

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are high, incomes are rising, present quality is low and fish is relatively abundant

The initial request for assistance from the PNG Government indicated a need for improving fish marketing facilities as a major component of any program of assistance in this sector. Analysis of the fish marketing situation in three potential target areas during the design process indicated that each of the infrastructures were not the critical constraint - there was capacity in facilities already available to market reasonable increases in fish sales, and there was substantial scope for increasing sales through outlets such as supermarkets, hotels and community stores and for marketing directly to consumers from vehicles and throughout urban areas.

The design team identified the major need as human resource development - the pervasive development constraint in Papua New Guinea. The PNG population, even in coastal areas, has relatively little heritage of fishing, and fishing and fish handling skills are poorly developed (See Annex I). Participation in fishing is low despite the apparently high potential returns available (See Annex H). The project will therefore deliver technical assistance and training. Facilities development will not be required for project success.

In the situation where small-scale fishing is at a relatively low level throughout PNG, the project will aim not only to achieve measurable gains in the project areas, but also to seek for, and to test strategies for coastal fisheries development which can be applied throughout PNG. Particular attention will be paid to documenting and transferring insights and data about the project experience which can be used by the PNG government as it moves to give greater priority to coastal fisheries development across the country.

III. PROJECT ELEMENTS

A) PROJECT DESCRIPTION

The project will have four major elements

- planning and analysis
- resource assessment
- production
- marketing

1) Planning and analysis

The PNG component of this project will be the most challenging to implement In Papua New Guinea,

- fishing activity is less developed than anywhere else in the region,
- there is very little experience with small-scale fisheries aid projects;
- there is a complex and important sociocultural setting, and in particular there is almost no readily available information about issues such as the likely response of different community groups to opportunities to increase incomes from fishing and the pattern of participation by women in fisheries activity,
- there is very little information about the fishery resources,
- there is a critical lack of human resources in the public and private sector

The PNG component will therefore include a preliminary planning phase aimed at

- establishing in more detail mechanisms for working with coastal communities and provincial fisheries administrations,
- searching out arrangements to strengthen the enterprise development, and business and financial management training aspects of the project,
- documenting social and cultural features of importance to the project, evaluating in particular criteria by which communities and individuals with stronger predispositions towards sustained participation in commercial fishing might be identified and ways in which the project implementation can be adjusted to enhance participation by women,
- proposing the phasing of activity in the three target locations (Lae, Madang and Rabaul) over time. Here the planning phase needs to trade off the likelihood of the stronger prospect of generating sustained incomes around Lae, a larger center, with some

small-scale fisheries development underway, with some assistance already from German aid, with clear and substantial unsatisfied demands for fish, and around Madang where fish production and consumption is at lower levels, where the direct impact of A I D assistance might be less, but where there might be clearer information on the outcomes of strategies,

- confirming the pattern of technical assistance and training necessary to meet the project purpose including determining more specific project outputs,
- training staff of involved provincial agencies in project planning and implementation including the holding of a planning workshop the selected project start-up area

This planning phase will include six months effort by an experienced small-scale fisheries development specialist and three months effort by a social scientist

The attention to project analysis will be continued through regular analysis by a social scientist and a fisheries economist during the project, and by the inclusion of project analysis and monitoring as a major function of the fisheries development advisor/team leader

2) Resource Assessment

The resource assessment activities will serve the objectives of

- guiding the project activities aimed at expanding fish production by indicating the pattern of available resources and the location of fishing grounds,
- providing the information on the abundance of the resources and the impact of fishing necessary for the formulation of resource management strategies,
- measuring the impact of the project on fishery resources in the project locations, and
- providing information on tropical fish resources and the impact of fishing which will be applicable in other parts of Papua New Guinea and the South Pacific region

In addition, the data collection systems that are at the core of a resource assessment program provide a source of information on parameters such as the volume of catches and numbers of people participating in fishing on which the monitoring and evaluation of the progress and impact of the project can be based

The resource assessment element of the project will be based on the work of the fisheries scientist planned for a two year term. The scientist will design and implement shore-based systems to collect and analyse data on parameters such as catch by species, standardized fishing effort, gear and location of fishing grounds. With the contribution of the time of a government fisheries research vessel, the scientist will also design and implement survey programs to be undertaken at sea

Training in aspects of resource assessment will be provided to provincial and national fisheries staff through workshops, scholarships and the training and participation of counterpart staff

Since there are very few areas in the world where coral reef fish stocks are as lightly fished as they are in Papua New Guinea, consideration will be given at a later stage to an association with the A I D centrally funded Fisheries Stock Assessment Collaborative Research Support Project

3) Fish Production

The major element of the Papua New Guinea component will be the work to increase the value of fish production based on five person years of senior fishing specialist effort. This effort will have the aims of

- increasing fish catches through the adaptation of existing fishing methods, gear and craft and the introduction of new methods, gear and craft,
- reducing fishing operating costs and otherwise improving the efficiency of fishing operations and
- increasing the value of catches and their marketability by improving the quality of fish landed through improved fish handling on board

The senior fishing specialists will work directly with local private sector fishing operators in villages which have reasonable access to resources and markets. Project

participating villages will be identified by drawing on the results of the socio-cultural analyses in the project planning phase and through consultation with provincial fisheries administrators and community groups

The effort of the senior fishing specialists will be aimed at adapting fishing practices to local conditions and then demonstrating these practices. These specialists will work from small boats of a kind available locally or capable of being acquired or produced for local use. They will work directly with village fisher groups, and will also conduct village and area workshops. Training will be provided to counterparts from the provincial fisheries administration extension service. The training will include aspects of business and financial management. Opportunities for strengthening the small enterprise development, and business and financial management training aspects of the project by working with local institutions with capacities in these areas will be explored in the planning phase. Short term boatbuilding technical assistance will provide for assessment of boatbuilding needs and training.

4) Marketing

The aim of the marketing element of the project will be to increase the sales and consumption of fish in the project region by working with the private sector to improve technical and business abilities. A marketing specialist will work with fish traders to improve fish handling, presentation, packaging and business methods, coordinating with the work of the fishing specialists to improve the quality of fish landed. The marketing activity will include workshops, publications of manuals for local conditions and a fish marketing study tour to other regional locations.

B) PROJECT INPUTS

1) Long-term Technical Assistance Staffing Arrangements

Fisheries Development Advisor The fisheries development advisor will be designated team leader and will be responsible for the administration and management of all in-country project operations, and for the direction of project staff.

Extensive duty travel will be required between project areas and for consultation with government officials. The manager will require to have proven experience with small-scale fisheries development projects and should have a particularly strong capacity to produce analysis of project results in social economic and technical areas

Fisheries Scientist A fisheries scientist will be required for a period of two years to establish and run a resource assessment program, to analyze field data, and to provide guidelines for scientific management of the inshore fisheries. Experience required will be a good background in tropical fish stock assessment and the dynamics of exploited fish populations. The fisheries scientist will train provincial fisheries officers in the collection of field data and fisheries statistics

Marketing Specialist A marketing specialist will be required for a period of two years to provide assistance to the private sector in expanding present marketing systems and developing new opportunities. The focus will be on increasing the sales and presentation of fish for local consumption. The specialist should be familiar with the operations of small businesses and be able to provide guidelines for fish traders who want to improve their business and for individuals who wish to develop activities in the fish marketing sector. The specialist will also be responsible for presenting workshops in small business administration in the three project areas

Senior Fishing Specialists Two senior fishing specialists, will be required for a total period of five years. They will need to have had extensive experience in small-scale fishing in tropical areas, in particular hand reel fishing for bottom fish and trolling or longlining for pelagic species. These specialists will demonstrate the correct gear, fishing techniques, method of anchoring on the reef slope, on-board handling of the catch, care of motors, boat handling, seamanship and safety on board. These skills will be transferred to village fishing families and to fisheries extension workers. Duties of the specialist will involve considerable sea time on small boats and in fishing villages. A high level of fitness will be required

2) Short-term Technical Assistance Staffing Arrangements

Fisheries Planner The initial phase of the fisheries development project for PNG will require an in-depth planning stage to better specify the components of the project. Six months of short-term technical assistance at the professional level have been designated for this task. There are complex issues at each of the project sites that need to be addressed.

Social Scientist There are several socio-cultural issues that have to be carefully examined throughout the life of the project. The level of fishing activity within the project area varies widely. Socio-economic questions need to be answered to develop small-scale fisheries in all of the areas of PNG. Traditional fishing rights and reef tenure need to be interpreted correctly for operational protocol. Particular attention needs to be paid to developing the project to protect and enhance participation in small-scale fisheries activity by women. The social scientist has to be well versed in the socio-cultural aspects of fisher groups in developing countries. A social scientist is required for the initial planning phase of the project for a period of three months. He/she will also be required for two 2-month periods during the second and fourth year of the project.

Fisheries Economist A fisheries economist's assessment of the production and marketing potential for the project areas is required so that reasonable goals are set during the life of the project. The fisheries economist will study the micro-economic environment of each of the regions to identify the constraints that will exist for proper implementation of project design. The fisheries economist will be required for a total of two months during years 1 and 4 of the project. The second visit will be to assist in internally reviewing the project and analyzing project results.

Postharvest Specialist The postharvest specialist will be responsible for assessing and rectifying conditions that exist in the marketing chain that may lead to these losses from fish spoilage. He/she will coordinate extension activities and assist in workshops. The postharvest specialist should have work experience in developing countries and be familiar with decomposition and quality assessment of tropical fish. He/she will spend a total of four months in-country.

Boatbuilding Facilities and technical skills for the production of small fishing boats will be required to expand the catching sector. It may be possible to meet these needs through existing private sector businesses or government projects. However, additional assistance may be needed. The equivalent of six months of effort to cover this have been allocated. These could be used for the services of a boatbuilder, to study credit requirements, provide training or boatbuilding equipment.

Survey Staff Short-term local technicians will be required to undertake survey work for social science, economic and resource assessment surveys.

3) Training

Resource Assessment and Monitoring Three provincial fisheries officers will be trained in resource assessment and monitoring methods through attachment as counterpart staff to the project. In addition, two 2-week technical training courses in sampling, data collection and analysis will be conducted. Support for two years of M S training will be provided.

Fishing Technology As well as being trained in the field by the senior fishing specialists, village fisher groups will be trained through participation in technical workshops. Two 1-week workshops will cover fishing methods, boat and engine maintenance, and boat handling. Fisheries extension officers will also participate in the workshops.

Fish Handling and Marketing Training in on-board fish handling will be carried out by the senior fishing specialists. This will be followed up by three 1-week workshops (one in each area) during which more intensive training will be given including all aspects of fish handling, use of ice, chill storage, freezing and frozen storage, fish cutting (filleting, etc), hygiene and quality control. The fish marketing specialist will provide training to fisher groups and retail employees on an individual basis as required, and as a segment of the fish handling workshops. Counterpart training of the chief marketing officer (DFMR) will be carried out. In addition, a study tour for senior officials and private sector marketing managers will be arranged. This could

be to Singapore, Kuala Lumpur, and the Philippines, where similar fish to those in PNG are marketed

Small Business Management Three 1-week training courses will be held, to provide training in the financial aspects of village fishing projects and the operation of small retail outlets. The courses will include such topics as the principles of management, budgeting, and bookkeeping

4) Commodities

Vehicles Three pick-up trucks will be required for the fishing specialists and marketing specialist. A car will be required for the fisheries development advisor/team leader

Boats Four small boats will be required by the senior fishing specialists, probably two locally constructed canoes, one fiberglass skiff and one larger boat for work and one to be determined in the planning phase

Fishing Gear and Boat Equipment Hand reels, bottom fishing gear, trolling and longlining gear, miscellaneous tools and supplies will be required. Three echo sounders (400m range) will be needed by the fishing specialists, one with a range of 1,500m for placement of FADs. Full sets of boat safety equipment will be required

Materials for Fish Aggregating Devices and Ice Makers Materials for 9 FADs will be required: ropes, shackles, chain, buoys or rafts, miscellaneous hardware. Four small block ice makers (output 200-400 kg/day) will be placed to test ice making and usage.

IV LONG-TERM SUSTAINABILITY CONSIDERATIONS

Long-term sustainability considerations relate to

- fish resources
- profitability of fishing and fish marketing enterprises
- the strength of continued participation by village fisherfolk
- the capacity of provincial and national government fisheries extension services

A) Sustainability of Fish Harvests

As set out in Section I above, the fishery resources of Papua New Guinea including the target areas are substantially under-utilized. The project will promote wise patterns of utilization of resources in three major ways

- 1) it will encourage the development of fishing for deeper water resources, so that increased commercial fishing effort does not deplete the more accessible inshore areas which are more heavily utilized for subsistence fishing,
- 2) it will include an effort to measure the abundance of stocks and monitor the impact of fishing which will provide an improved data base for planning fisheries development and management in the target areas, and in Papua New Guinea generally, and
- 3) it will strengthen the capacity of the provincial and national fisheries administrations to plan and implement programs to avoid resource depletion through over-fishing

B) Profitability of Fish and Fish Marketing Enterprises

In the project locations there are substantial markets in major towns where fish consumption is currently relatively very low and where fish prices are high and quality is low. The analysis in Annex H shows that returns from small-scale commercial fishing are high even with relatively low assumptions of fish catches and taking into account the expected level of price falls as supply volume rises

C) Participation in Commercial Fishing

The social soundness analysis set out in Annex I traces the relatively low level of commercial fishing activity in the face of the income earning opportunities available largely to several sociocultural factors. These include the high level of productivity of subsistence activities and the lack of any real history of fishing in the Papua New Guinea mainland. The analysis concludes that there is no widespread social or cultural factor which can be expected to severely constrain coastal communities in the project area from participating in commercial fishing. In particular the analysis notes that cash gains from mineral development are a powerful stimulus for strengthening the force of modernization in Papua New Guinea. There is conclusive evidence from the response of coastal communities around Port Moresby, the country's largest urban center, that opportunities for profitable participation in coastal fishing will be taken up. Differences in the existing level of small-scale commercial fishing development within the project area also support this conclusion with more resource development already underway around Lae. At the same time, the planning phase of the project will be designed to identify factors such as the availability of alternative cash sources, levels of subsistence living, attitudes to needs for cash and history of fishing activity which would affect the apparent predisposition of communities to participate in small commercial fishing to assist in targeting project activities.

D) Capacity of Provincial and National Government Fisheries Services

The PNG activity has been designed so that it does not depend substantially on government inputs to achieve its purpose within the project area. The only requirement for recurrent expenditure beyond the end of project will be for the maintenance of the statistical system and analysis planned to monitor the impact of fishing on fishery resources. It is expected that this work will be able to be implemented within existing staffing levels of provincial fisheries administrations through training of existing staff, and within already planned increases in staffing levels in the national fisheries administration. However, the capacity of the government fisheries administrations will affect the degree to which strategies learned and developed in the project are taken up and applied to achieve further gains within the project area and in other parts of Papua New Guinea.

Of particular significance for this project is the planned strengthening of the Department's fisheries extension work. A new Extension division will be established for which the government is requesting a program of long-term technical assistance from the FAO/UNDP Regional Fisheries Programme. The present fisheries extension service is largely limited to a programme of development of locally built small-scale fishing craft. The Government will be looking to the results of the A I D project as a basis for its strategy for strengthening its extension activities across Papua New Guinea.

V ISSUES FOR PROJECT IMPLEMENTATION

Issues for GPNG

The GPNG will covenant that each long-term advisor funded under the project will have a counterpart during the entire length of his or her assignment.

The GPNG contribution will include research vessel time. Early discussions on timing of vessel use are required to enable the activity to be fitted in with the vessel's program.

Issues for the Contractor

The contractor will have to recruit five staff for long-term assignment in PNG at a time when social and political stability are a concern.

VI. KEY ACTIVITIES TO BE MONITORED

Planning Analysis Element

The planning phase will produce a more detailed plan for project implementation and will include a review of planning phase results with national and provincial officials and appropriate community groups at a project planning workshop. Analysis during the project will document social, economic and technical project results. This phase should be implemented within the first year to determine project targeting and avoid delays.

Resource Assessment Element

The resource assessment element will provide two streams of implementation - from the onshore surveys and statistical systems on fishing participation, catch and effort, and from research vessel surveys of fishing grounds and standardized test fishing results. This will provide for preparation of estimates of sustainable yields of project targeted resources and for monitoring of catch volume and composition and the impact of fishing on stocks.

Fish Production and Marketing Elements

Changes in fish production will be monitored from two sources - from the resource assessment data and from surveys of volumes and values of fish marketed at key retailing and wholesaling points.

VII POTENTIAL IMPACT OF PROJECT

The economic analysis set out in Annex H concludes that on the basis of very conservative estimates of catches by small-scale coastal fishermen, the direct impact of the project would be to increase catches and sales of fish in the project areas by over 200 tons or around \$500,000 value of fish per year. The strategies developed in the project were applied in areas of PNG through the planned strengthening of the government fisheries extension service. The analysis suggests that on conservative assumptions there is scope to increase catches to supply increased sales of fish in and around the population centers by 2000 - 2500 tons per year or around \$5 million value of catch per year within ten years.

VIII. COUNTRY COMPONENT BUDGET

Table E-5 sets out the estimated budget for the Papua New Guinea country component based on levels of effort in Section III above. Table E-6 sets out the proposed contribution by GPNG.

Table E-5 (continued)

Detailed Estimates of A I D Costs Papua New Guinea

	1990	1991	1992 (\$000)	1993	1994	Total LOP
2 Training						
a) Long-term			25	25		50
b) Short-term						
Workshops						
Project Planning	5	5				10
Resource Assessment		5			5	10
Fishing Technology			5	5		10
Fish Handling & Marketing			15	15		30
Fish Identification		5				5
Women in Fisheries		5	5	5		15
Financial Management			5	5	5	15
Training Materials		10	10	10		30
Sub-Total	5	30	40	40	10	125
c) Study Tours						
Fish Marketing			40			40
3 Commodities						
Vehicles	25	50	25			100
Boats and Fishing Gear		37	16	12		65
FADS		10	20	15		45
Ice Makers		7	14	7		28
Sub-Total	25	104	75	34		238
Component Total	189	697	1121	956	129	3092

Table E-6

Estimated Host Country Contribution Papua New Guinea

(\$000)

	1990	1991	1992	1993	1994	Total LOP
Long-term Counterparts						
Chief, Res Devel (1)	4	4	4	4	4	20
Provincial Res Officers		30	30	30	30	120
Provincial Est Officers		30	30	30	30	120
Marketing Officer		12	12	12	12	48
Counterpart Support		40	40	40	40	160
Sub-total	4	116	116	116	116	468
Facilities						
Lae Fish Market	250					250
Kokopo Fish Market	100					100
Office (Rabaul)		15	15			30
Workshops		30	30	30	30	120
Training Support Costs		16	40			56
Sub-total	350	61	85	30	30	556
Research Vessel						
Provincial		10	10	10	10	40
National (2)			100	100		200
Subtotal	0	10	110	110	10	240
Commodities						
Ice and Chill Stores			50	50	50	150
Total	354	187	361	306	206	1414

NOTES

(1) 25 per cent of time

(2) Six months use per year for two years including operating costs

ANNEX E

COUNTRY COMPONENT

TONGA

I. BACKGROUND AND RATIONALE

Although the Kingdom of Tonga has not as yet declared its Extended Economic Zone (EEZ), the Royal Proclamation of 1887 establishing the Kingdom's maritime boundaries should closely approximate the medians that will probably be adopted eventually, and will extend roughly between 15 and 23 5 degrees South Latitude, and 173 to 177 degrees West Longitude, encompassing an area of approximately 700,000 square kilometers. Tonga is comprised of three main island groups - Tongatapu in the south where the capital and main center of population, Nuku'alofa, is located, the Ha'apai group lying very nearly on the 20th parallel, and the Vava'u group situated some 70 miles further to the north. This archipelagic system lies on a generally southwest/northeast axis and most islands are comprised of coral formations with an overlying fertile soil developed from volcanic ash.

The economy is agro-based with copra and processed coconut products, vanilla, bananas, watermelons and some vegetables being the main export crops. However, the agricultural sector is still recovering from the effects of a severe drought in 1987 and this, together with more recent declines in world prices for Tonga's commodities as well as quarantine problems with certain specialized agricultural crops, has caused Government to assign a high priority to the development of increased fish production and other marine resources for export.

In this latter respect, Tonga is in an excellent position to take advantage of this policy. Not only does it lie within a rich area for all species of tuna, but its bathymetric configuration is unique among most South Pacific Island countries in that the Kingdom is comprised essentially of two mountain ranges along its main axis - one range to the west bordering the deeps of the Lau Basin and containing many submerged seamounts which support relatively large (albeit somewhat fragile) stocks of prime demersal fish, the other to the east near the edge of the Tonga Trench (one of the deeper areas of the Pacific) which contains a number of seamounts as well as the three island groups.

Ten years ago A I D funded the construction of two prototype offshore fishing vessels in Tonga through the Foundation for the Peoples of the South Pacific (FSP), a U S private voluntary organization. A United Nations Development Programme/Food and Agriculture Organization of the United Nations (UNDP/FAO) resource survey project had established that there were commercial stocks of deep bottomfish (primarily snappers and groupers) on offshore seamounts and the two vessels were constructed to test their commercial viability on these stocks. After a successful initial trial phase, a program to build an offshore small-scale fishing fleet targeting on bottomfish was established with assistance from Japan and the United Nations Capital Development Fund (UNCDF), and over 40 vessels (privately owned and costing approximately US\$30,000 each fully equipped) have been constructed to date. A I D continued to provide extension services and fish marketing assistance through this period. From 1986 to the end of 1988 the small-scale offshore fleet's fish landings had jumped from 321 m/t (valued at US\$315,700) to 1,046 m/t (valued at US\$1,890,000) but only about 60 m/t were exported. The development of the offshore fishery was aimed at satisfying a chronic shortfall of fresh fish on the domestic market and as an indicator of the program's success, the volume of imported tinned fish fell by 40 per cent during the period 1984 to 1988. Recent declines in both the value and quantity of agricultural export commodities have caused the Government to look to the fisheries sector for greater contributions to foreign exports, which are steadily increasing and by the end of 1989 should be on the order of 200 m/t with an export value of about US\$1 65 million.

The process of developing offshore bottomfishing operations is proceeding at a fairly rapid pace. The present fleet of 21 to 30-foot vessels is exerting considerable pressure on the seamount bottomfish resources within their range of about 100 miles from their ports in all three main island groups. There are still significant resources beyond this range, but the private fishing sector can be expected to acquire larger vessels to exploit them without further assistance.

Against this background there are two priorities in Tonga's offshore fisheries development which will be addressed in this project. The first is to increase knowledge as to the extent of the bottomfish resources so a management plan can be designed and implemented to avoid their over-exploitation and ensure that the gains now being achieved can be sustained. The second is to develop a small-scale offshore fishery for tuna.

When the offshore fishing fleet development program was begun in 1979, very little was known about the extent and nature of the bottomfish resources, and what the impact might be on them under sustained fishing pressure. Ten years later the experiences of other areas such as Hawaii and American Samoa have shown that bottomfish stocks can be easily and rapidly depleted by over-fishing.

Recognizing this, the emphasis of government programs with respect to bottomfish resources has shifted from fleet development to resource management and conservation. With assistance from the U S National Marine Fisheries Service (NMFS), the Tonga Fisheries Division has put in place a comprehensive data collection system and has been strengthening its research capacity with the aim of formulating estimates of maximum sustainable yields (MSY) for the bottomfish resources, and a management plan to avoid over-fishing.

Although this resource assessment and management program is important for determining MSY for the present small-scale fishing fleet, the real scope for development in the fisheries sector lies in harvesting the huge offshore stocks of tuna. By comparison, the annual MSY for bottomfish reserves in Tonga seem likely to be in the range of 1,000 to 1,200 m/t while that for tuna is more likely to be from 15,000 to 20,000 m/t.

However, the tuna are more difficult to catch, handle and market, especially for small-scale fishermen. Across the South Pacific, tuna catches of around 500,000 to 600,000 m/t are taken annually, virtually all by large industrial vessels costing from US\$1 million to US\$15 million each, and with over 90 per cent of the fleet being foreign owned.

Recent developments in small-scale tuna longlining technology by American fishermen in Hawaii and the Gulf of Mexico, and by Australians, have opened the possibility of introducing similar techniques in Tonga. In areas such as Guam and Fiji, these techniques are being used successfully now by vessels in the 50 to 60-foot class costing from US\$200,000 to US\$300,000 each.

Such vessels are still beyond the technical and economic reach of Tongan fishermen and those in other South Pacific countries. The challenge is to find a smaller vessel and new fishing methods that are technically and financially within the Tongan fishing operator's ability to acquire.

This approach would have two main benefits for Tonga. If new tuna longlining technology could be adapted by the present fishing fleet, it would provide an alternative fishery at least during the peak tuna fishing season and point to a strategy for easing fishing pressure on bottomfish stocks and reducing the risk of over-exploitation. Beyond this, proving a new and viable year-round small boat tuna fishing method would open the prospect for an entirely new fleet of small-scale vessels.

Tonga is a leading example of the development of small-scale fisheries in the South Pacific region. Across the region, small-scale fishing operators are steadily increasing catches and exploiting the more accessible and vulnerable resources, including deep bottomfish. In most countries of the region there is still scope for expanding small-scale offshore catches of bottomfish, but in time, with the technologies already available and with increasingly strong export demands for these fish, the stocks can be expected to face the risk of over-exploitation in the not so distant future. In the waters of every island nation there are, as in Tonga, huge stocks of tuna offshore almost completely exploited by large foreign vessels. Demand for high quality fish products is rising around the world with rising incomes and greater diet consciousness - for example, consumption of fish products increased by 25 per cent in North America during the past five years. Most of the world's known natural fish stocks are now fully or over-exploited and prices for high quality products are rising.

The Fifth Five Year Development Plan for Tonga for the period of 1986 - 1990 attaches the highest priority to the allocation of public sector and development assistance resources to the fisheries sector among primary production activities. Within the fisheries sector, the government attaches the highest priority to artisanal fisheries development, and this project will be the major activity in this sector through its life.

II PROJECT OBJECTIVES

The purpose of this project is to adapt and apply new fishing technologies and fisheries management strategies to expand small-scale offshore fisheries in Tonga. If the trial fishing phase is successful, it will provide an opportunity for the development of new small-scale tuna longline vessels which will harvest the present largely unexploited tuna stocks.

FIGURE E 4 LOGICAL FRAMEWORK TONGA

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROGRAM OR SECTOR GOAL</u>	<u>MEASURE OF GOAL ACHIEVEMENT</u>		
To increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation and management of natural resources	<ol style="list-style-type: none"> 1 Increase in numbers of men and women engaged in small scale tuna fishing processing and servicing in ten years 2 Increase in incomes from small scale offshore fishing activities in ten years 3 Increase in local sales and exports of tuna from small scale fishing operators in ten years 4 Employment incomes and exports in the bottomfish fishery at or below sustainable levels 	<ol style="list-style-type: none"> 1 In Tonga MAF survey data on participation in small scale fishing 2 GOT trade statistics and export figures 3 GOT agricultural census data Regionally 4 Similar data in other countries to which the technology is transferred 	<ol style="list-style-type: none"> 1 Projected tuna and bottom fish prices are maintained or rise 2 Tonga and other Pacific countries remain competitive in Pacific rim countries in exports of tuna and bottomfish 3 Infrastructure & service development in transport sector keeps pace with increasing fish export market
<u>COMPONENT PURPOSE</u>	<u>END OF PROJECT STATUS</u>		
<ol style="list-style-type: none"> 1 The <u>national</u> purpose is to test small scale offshore tuna fisheries in Tonga to relieve pressure on bottomfish stocks 2 The <u>regional</u> purpose is to adapt and demonstrate a widely applicable technology for small scale tuna fishing 	<ol style="list-style-type: none"> 1 Different vessels fishing methods and marketing arrangements have been tested for small scale tuna fishing and results of these tests are widely available after three years 2 The catches of bottomfish are at sustainable levels as defined by project results and national policy 3 The results of the activity are being transferred for use in small scale tuna fishing and marketing by EOP in other Pacific Island countries 	<ol style="list-style-type: none"> 1 In Tonga Published project reports on trial fishing phases 2 MAF survey data on small scale catches of tuna and bottomfish 3 Legislation to manage and conserve bottomfish 	<ol style="list-style-type: none"> 1 No dramatic changes in oceanographic or climatic conditions 2 GOT adopts a program to limit bottomfish catches 3 Conditions in Tonga for small scale tuna fishing are reasonably representative of conditions in other areas of the Pacific Islands region

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
1 Trial tuna fishing operations completed	1 Two years trial tuna fishing completed and gear tested by year three	1 Project reports 2 MAF survey data on number of vessels by gear type	1 Time is sufficient to test appropriate method & vessel size
2 Findings available on viability of small scale tuna fishing vessels and methods and appropriate technology	2 Reports published on a range of major fishing methods or variations in fishing methods within three years	3 GOT National Resource Plan 4 GOT trade statistics	2 GOT has personnel who can interpret and apply bottomfish resource management plan
3 Depending on trial results, introduction of small scale tuna fishing gear and methods to the existing fleet and design of prototype vessel with appropriate gear and fishing methods	3 Appropriate size vessel for tuna fishing determined 4 Bottomfish management plan based on analysis of five years bottom fish catch and survey data being used in national resource planning		
4 A management plan for deep bottomfish (and inshore resources in Tonga?)			

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<u>INPUTS</u>			
A I D	Type of Input	A I D	GOT
		(\$000)	
6 years of long term T A (fishing specialist, fisheries development advisor), 2 years of short term T A , 2 trial fishing vessels, other commodities, short term training for resource managers and Tonga fishing experts and 5 person years of long term training	Long term T A Short term T A Admin/Operating Costs Training Vessel charter Commodities Facilities Total	1428 400 52 119 148 190 <hr/> 2337	91 705 40 836
GOT one trial fishing vessel for three years and two support vessels with crew and operating costs fisheries extension services support, technical staff to produce bottomfish management plan project support			
		1 A I D and GOT records and budgets 2 GOT National expenditure	1 Long term experts required can be found to live in Vava'u Tonga

It may also provide new fishing methods which can be adopted by the existing small-scale fleet to expand their catches. Improved management of the bottomfish resources will maintain catch rates at an acceptable and economic level, thereby maintaining the viability of this fishery and the overall levels of bottomfish catches.

The regional purpose is to adapt and demonstrate a widely applicable technology for small-scale tuna fishing. If the trial fishing in Tonga is successful, there are good grounds for believing that it will be successful in other parts of the South Pacific and that the technologies developed will be applicable to fishing grounds in other parts of the region.

In terms of the abundance of tuna resources, Tonga is reasonably representative of the region. In countries such as Papua New Guinea, Solomon Islands, Kiribati and Tuvalu research data and fishing results by foreign vessels show that these fishing grounds are likely to be richer in tuna resources than Tonga, Fiji and Western Samoa, with the Cook Islands and Niue being likely to have less tuna within their respective EEZs than the latter three.

In terms of the type of vessels being tested, they could be built and serviced in most countries in the region now or with some assistance to develop boatbuilding in time.

In terms of market access, Tonga is also reasonably representative. Surface shipping is reasonably good, as it is in most countries in the region. Air service to major markets are more limited than those available to Fiji, PNG or Western Samoa, but better than other countries in the region.

III. PROJECT ELEMENTS

The strategy of this project is to rationally utilize the three sectors of the Tongan fishery, which is similar to that of most other Pacific nations and islands. The inshore (usually reef and lagoon) fishery receives the most intense fishing pressure. Many of these fisheries are over-harvested, which is the case in Tonga. Only recently, deep water bottomfish resources have been targeted, with the purpose of increasing the harvest, but with resultant lessening of pressure on the inshore resources. Inshore fisheries can rejuvenate reasonably quickly by recruitment from other areas.

and, many species exhibit rapid growth. In contrast, growth of deep water bottomfishes is slow, allowing heavy fishing pressure to deplete the stocks quickly. Therefore, the third sector can be tapped, large pelagic fishes, especially tunas, that have been targeted mostly by large foreign fleets. This project addresses this sector, while assessing the stocks of the bottomfish as an input to the overall management fisheries strategy for Tonga.

The approach of this project is to test and compare small boats for their utility in small-scale longlining, while concurrently comparing applicable longlining methods (horizontal and vertical). The current offshore bottomfishing vessels are of 28 foot length, which is of doubtful size for longlining. Thirty-five and 40 foot vessel trials will be the core comparison, however existing 28 foot boats will be tried (one 28 foot charter for one year) after the larger ones are found to be successful. Further, horizontal longlines applicable to each boat in question will be tested, as well as vertical longlines, both adapted to the vessel design in question.

Concurrent data collection on species, catch/effort, conditions, gear considerations, and depth will allow determination of seasonal abundance by species as well as fishing potential.

First and second elements are therefore boat size and longline type. The third element is bottomfish stock assessment. The seamounts on which current bottomfishing activity is conducted also attract pelagic tunas. Fish aggregating devices can be placed on the seamounts to assist in this attraction. As the tunas are highly migratory, meaning the stocks migrate throughout the South Pacific, no effort will be made to calculate MSY of the tuna stocks (the South Pacific Commission is engaged in this effort). However, since the move to pelagic tunas is a management strategy to protect the more fragile deep water bottomfish stocks, it is appropriate to continue the assessment task begun under earlier A I D funds under this project.

Specific A I D assistance will include

- 1 Charter of thirty-five foot vessel
- 2 Required refitting of GOT forty foot boat
- 3 Provision of two senior fishing specialists for 4 1/2 years total
- 4 Crew for both vessels
- 5 Fishing equipment (specific list in H Sperling Report, June, 1989)
- 6 Technical assistance in stock assessment for the bottomfish element
- 7 Naval architect technical assistance near end of project
- 8 Technical assistance in marketing
- 9 Long-term training - one U S master's level and one three year diploma at U S P

Staffing Arrangements

The project component will provide three full time positions, a fishing development advisor, as team leader, and two senior fishing specialists, for whom the requirements are

- 1) Fishery Development Advisor (team leader)
 - a) Responsibilities
 - overall management of project component
 - interaction with GOT
 - interaction with project manager
 - oversight of fishing specialist, including experimental design
 - scientific data collection - design and handling
 - interaction with short-term technical assistants, including scheduling
 - resource management surveys
 - b) Background
 - minimum B A degree, preferably in fisheries or biological science
 - experience in isolated locations
 - experience in developing country environments
 - business or marketing experience or training desirable.
- 2 Senior Fishing Specialists (2)
 - a) Responsibilities
 - one fishing specialist will have principal responsibility for each vessel - 35 and 40 foot, including scheduling, crew, etc

- each fishing specialist have primary responsibility for horizontal or vertical longlines, but both will be used on each vessel, this includes gear responsibility
- training of local fishers in vertical and horizontal techniques
- data collection on fishing methods, timing, species, biological data, conditions

b) Background

- one fishing specialist will have a minimum of two years experience in either vertical or horizontal longlining, and one in the other, resulting in one having two years in each method
- minimum of two years experience with small-scale vessel operation
- minimum of two years in LDC environment
- experience with statistic data collection

IV. LONG TERM SUSTAINABILITY CONSIDERATIONS

A Sustainability of Fish Harvests

Due to the bottom configuration in the Tongan EEZ (Exclusive Economic Zone), with numerous near surface seamounts and associated biota, and due to existing and increased interest in fishing greater distances from shore by Tongan fishermen, there is no doubt that seamount fishing will continue. The tuna resources are still underdeveloped in the South Pacific, according to all estimates of stocks. Assuming abundance of various species of tuna in sufficient numbers, sustainability of the fishery is highly likely. The primary constraint will be export transport, however this is rapidly changing for the better.

The location of the project will be Vava'u, which is closer to the abundant Tongan seamounts of northern Tongan waters. Infrastructure development is likely to be a result of the project, as is additional development of seamount bottomfish resources in the northern sector. Offshore tuna fishing development in southern Tongan waters will be likely, as an alternative to bottomfishing, which will be assisted with bottomfish management strategies.

With development management strategies, both offshore tuna and bottomfish stocks will supply fish for the long-term. The GOT Fisheries Division will continue monitoring its fisheries resources after termination of the project as a means of

maintaining sustainable yields Fishery resources are likely to play an increased and major role in the export economy of Tonga

B Sustainability of Participation by Beneficiaries

The project social soundness analysis in Annex I concludes on the basis of experience with previous small scale fisheries development activities in Tonga that Tongans will take full advantage of opportunities for profitable investment and rewarding employment in small scale offshore fisheries

C Sustainability of Government Activities Necessary For the Project Purpose

Annex G describes the strengthening of GOT commitment in policy and recurrent budget to the fisheries sector Financing for the counterpart staff to be assigned to the project and for the government vessels which will be used during the project is already included in GOT budget for 1990

The major long term sustainability issue in relation to government recurrent activities is the sustainability of the GOT fisheries research and management capacity necessary to implement any bottomfish management program

The GOT has previously made a substantial commitment in this area, and has developed an outstanding program of data collection and analysis on the bottomfish fishery with assistance from the U S National Marine Fisheries Service (NMFS) Two GOT research staff are undertaking postgraduate study on stock assessment, and in July 1989, two technical staff are attending our A I D funded workshop on bottomfish stock assessment in Honolulu However the high rates of emigration of skilled people from Tonga will likely remain as a potential problem for continuity of this kind of program

V. ISSUES FOR PROJECT IMPLEMENTATION

A. For government

- 1 Release of 40 foot vessel for exclusive use of project

- 2 Upgrade and maintenance of Vava'u fisheries infrastructure
- 3 Obtain approval and waivers for contract personnel and equipment
- 4 Select individuals for participant training

B For A I D

- 1 Determine charter options for 35 foot vessel
- 2 Determine availability of NMFS resource assessment specialist for stock assessment technical assistance on bottomfish
- 3 Verify GOT approval and waivers for personnel and equipment

C For Contractor

- 1 Verify Vava'u as primary location for vessel/gear testing
- 2 Contract with two senior fishing specialists and crews for two vessels
- 3 Verify gear design and refit vessels accordingly
- 4 Obtain gear of appropriate configuration
- 5 Locate naval architect for use on later stage of project

VI. KEY ACTIVITIES TO BE MONITORED

- 1 First deployment of horizontal longline gear on each size vessel
- 2 First deployment of vertical longline gear on each size vessel
- 3 Deployment of fish aggregating devices on seamounts and sea slopes
4. Determination of seasonal abundance of tuna by species
5. Determination of best vessel size and gear for small-scale tuna fishing development in Tonga, considering economic factors
6. Determination of suitability for existing small-scale fleet to be included in tuna fishing

7 Establishment of best vessel design, using test results as interpreted by naval architect

8 Establishment of marketing strategy for small-scale tuna fishery in Vava'u

9 Determination of MSY and establishment of management plan for Tongan deepwater bottomfish

VII. POTENTIAL IMPACT OF PROJECT

Because this project will be testing new technologies and strategies, it is difficult to quantify the likely income gains. However, if the test phases of the project are successful, there will be income gains from the operation of a new fleet of small-scale tuna vessels concurrent with increased private investment, from the adoption of small-scale longlining methods by the existing fleet, and from sustaining bottomfish resources at acceptable levels through management policies based upon empirical data and accepted stock assessment practices. Broad estimates of the value of these income gains could be derived as follows

- over a ten year period, there is the capacity in Tonga to develop a fleet of 40 to 45 new small-scale tuna vessels following a strategy similar to that through which the existing bottomfishing fleet was developed over the previous decade

The potential annual value added by the production activities generated by the project is \$3.3 million. This result would be achieved about seven years after private initiatives adopted project techniques and, approximately ten years after the initiation of the project. Vertical longlining will be adopted first because it is more closely linked to present methods and requires a substantially similar investment than the more conventional horizontal longlining. The investment will be distributed over five years in ten new boats. Horizontal longlining will also develop over five years with ten new boats but begin a year late. The internal rate of return (IRR) on the domestic value added by the private tuna production sector will be 93% over a 20 years allowing for engine replacement for each boat in its tenth year. This IRR suggests an attractive and sustainable economic development.

- if the existing fleet were able to adopt small-scale tuna longlining methods during a 5-month tuna season, there would be gross income gains by the end of this project amounting to US\$2.5 million annually

- if the bottomfish resources are not protected from depletion by excessive fishing pressure, experience from other areas suggests that bottomfish catches will fall by some 50% within five years. An effective bottomfish resource management program can be projected to increase incomes from these resources by \$1.6 million.

Estimating the pattern of income gains through time across the region from this project's results is even more difficult to quantify. There are potential gains in incomes to be derived from this project in every country in the South Pacific. The speed at which those gains can be realized will depend upon factors such as access to markets, abundance of resources, and present level of fisheries vessels now working the seamounts further offshore than in any other country and delivering increasing quantities of high quality fish for export. The level of small-scale fisheries development in other countries in the region varies greatly. Fiji and Western Samoa could adopt this new technology very swiftly if the Tonga results appear viable. In other countries such as Solomon Islands and Papua New Guinea, more time would be needed for adoption. But even in these countries small-scale fishery development programs that are already in place can be expected to place local fishing operators in a position to adopt these techniques in time.

VIII COUNTRY COMPONENT BUDGET

Table E-7 sets out the proposed budget for the Tonga country component based on estimates of levels of effort set out in Section III above. Table E-8 sets out the proposed contribution by GOT.

Table E-7 (continued)

NOTES

- (1) See Annex G (Section IV) for technical assistance cost rates
- (2) Training costs - one two year Master's degree at \$50,000, 2 three year diplomas at the University of the South Pacific at \$24,000
- (3) Charter Vessel Cost

Item	28 foot	35 foot (\$ per year)	40 foot
Vessel (a)	6,000	7,500	
Crew	10,000(b)	6,000 (c)	6,000
Operating Costs (e)	14,000	16,500	10,000
Total	30,000	30,000	6,000 (d)

- (a) Based on informal quotes
- (b) Assumes 3 crew plus skipper paid only for 3 weekly trips per month, plus 50 per cent of catch or catch value
- (c) As for 28 foot vessel, but excludes skipper funded as technical assistance
- (d) Four crew, plus initial refitting costs \$10,000, vessel and operating costs contributed by GOT
- (e) Assumes fishing 3 weeks per month

Table E-8

Estimated Host Country Contribution Tonga
(\$000)

	1990	1991	1992	1993	1994	Total LOP
1 Long Term Counterparts (1)						
Project manager (1)	5	5	5	5	5	25
Research officer (1)	5	5	5	5	5	25
Extension officer (1)	5	5	5	5	5	25
Tech services officer(2)	2	4	4	4	2	16
Sub-Total	17	19	19	19	17	91
2 Facilities						
Offices	5	5	5	5	5	25
Vessel/Repair	3	3	3	3	3	15
Sub-Total	8	8	8	8	8	40
3 Vessels (5)						
40 ft fishing vessel operation (3)	20	35	35	35	20	145
Capital	25	25	25	25	25	125
Bait catching vessel operation (4)	10	20	20	20	10	80
Capital	10	15	15	15	15	70
Support vessel operation (4)	20	40	40	40	30	170
Capital	15	25	25	25	25	115
Sub-Total	100	160	160	160	125	705
Component Total	125	187	187	187	150	836

NOTES

- (1) Assumes salary and fringe benefit levels, Project manager, one Research and one Extension Officer, \$5000 per year, Technical services Officer \$4000 per year
- (2) Assumes one full time equivalent of refrigeration mechanic, marine engineer, boatbuilder.
- (3) Excludes crew
- (4) Part time use on the project
- (5) Refers to:

Vessel	Per cent of Use	Capital Value (\$000)	Annual Capital Value to the Project (\$000)
40 foot	100	200	50
bait catcher	60	200	15
support vessel	50	400	25

ANNEX E

COUNTRY COMPONENT

TUVALU

I. BACKGROUND AND RATIONALE

Tuvalu is an archipelagic chain of nine coral atolls lying in a general northwest to southeast direction, roughly between Latitudes 5 and 10 degrees South, bounded by Longitude 176 degrees East and the 180th meridian, with a total land area of 26 sq km. The capital, Fongafale on Funafuti atoll, is the center of population as well as economic activity. Funafuti lies about 8 degrees - 40' Lat S, some 470 km SE of Nanumea and 250 km NE of Niulakita, the two atolls at each end of the chain. The Exclusive Economic Zone (EEZ) covers an area of around of 600,000 sq km.

The economy is basically subsistence agriculture and fishing, with the main cultivated food crops being bananas, breadfruit, sweet potato, pandanus and taro, and copra is the only commodity produced for export. There is little arable land on these coral-based atolls so any further expansion of agriculture is unlikely or limited at best.

With such a limited economic base, the government is highly dependent upon grants-in-aid to meet shortfalls in recurrent budget expenditures as well as its balance of payments deficits, and bilateral aid for capital improvement and economic development projects. To summarize, Tuvalu's economic future is bleak. With a real GDP per capita of \$280 in 1985, Tuvalu meets the United Nations criteria as a "least developed country".

The fisheries sector has received substantial bilateral aid for development in the past, and will continue to receive more during the quadrenium of the current Development Plan IV - 1988 to 1991. The main thrust of services aid provided has been small boats, equipment, fishing gear, and marketing facilities.

to ensure a sufficient supply of fish protein for the population, principally on Funafuti where there was a shortfall, and to reduce the importation of canned fish products to conserve foreign exchange. These objectives have been achieved - possibly they may have been over-achieved in view of present fishing capability (albeit limited to the lagoons, outer reef slopes and nearshore waters) and the extensive refrigeration facilities available for a very limited commercial market, which operate at a loss.

With pressure on inshore fish stocks, significant expansion, especially for export, is limited for Tuvalu. In respect to the fishery continuum, the next potential resource base is the offshore bottomfish. However, as shown just recently in Tonga (see Tonga component) overdevelopment of this resource is easily possible. First, a reasonable resource assessment must be made, second, a rational management plan must be developed, and third, appropriate private sector capital development must be attracted. It is the purpose of this project to follow this scheme.

II PROJECT OBJECTIVES

The national purpose of the project is to adapt and apply new fishing technologies and fisheries management strategies to expand small-scale commercial offshore fishing operations targeting initially on bottomfish along the seamounts to the north and south of Tuvalu. This project proposes to encourage the development of offshore fishing for export under a careful management regime, thereby creating new opportunities for economic gains and protecting the more heavily exploited nearshore resources from depletion through over-fishing. The project will involve two main thrusts:

- 1) Bottomfish resource assessment and management
- 2) Establishment of a fleet of small-scale offshore fishing vessels operated by private Tuvaluan fishing operators

FIGURE E 5 LOGICAL FRAMEWORK TUVALU

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>PROGRAM OR SECTOR GOAL</u>	<u>MEASURE OF GOAL ACHIEVEMENT</u>		
Increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation of natural resources	<ol style="list-style-type: none"> 1 Estimate of annual net incomes of bottomfishing vessel operators and crew 2 Estimates of long term (after ten years) potential yields and earnings 	<ol style="list-style-type: none"> 1a Gross sales compared to bottomfishing vessel operating cost model (contractor) 1b Quarterly focus group interviews of bottomfishing vessel operators and crew members by contractor 2 Post project impact evaluations 	<ol style="list-style-type: none"> 1 Projected bottomfish and tuna prices are maintained 2 Tuvalu and other Pacific countries remain competitive among Pacific rim countries in exports of bottomfish and tuna
<u>COMPONENT PURPOSE</u>	<u>END OF PROJECT STATUS</u>		
<ol style="list-style-type: none"> 1 The <u>national</u> purpose is to adopt and apply new fishing technologies and fisheries management strategies to expand small scale commercial offshore fishing operations, targeting initially on bottomfish 2 The <u>regional</u> purpose is to test and demonstrate a widely applicable strategy for small scale commercial offshore bottom fishing 	<ol style="list-style-type: none"> 1 A strategy for establishment of a sustainable bottomfish fishery has been tested and results of this tests are available after three years 2 Catch levels (volume of yield of bottomfish in metric tons) are sustainable as defined by stock assessment results (estimated Maximum Sustainable Yield in metric tons) and profitability (gross sales value minus model of costs) to private Tuvaluan fishing operators 3 Conclusions on the replicability of bottomfisheries strategy are disseminated through the regional component 	<ol style="list-style-type: none"> 1 Contractors semi annual and final report on viability of bottomfish strategy 2a Catch and effort logsheet data compared to MSY estimate (stock assessment consultant/Fisheries Division) 2b Estimates of profitability derived from gross sales compared to bottomfishing vessel operating cost model supplemented by quarterly focus groups interviews 3 Regional Components records 	<ol style="list-style-type: none"> 1 No dramatic changes in oceanographic conditions 2 GOT participates in the development of a bottom fish resources management plan

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
<p>1 Assessment of bottomfish resources of Tuvalu</p> <p>2 A management of plan for bottomfish in Tuvalu</p> <p>3 Depending on stock assessment results and success of mothership over the sales arrangement, establishment of an initial fleet of small scale commercial offshore fishing vessels</p> <p>4 Findings on the viability of small scale commercial fishing and mothership over the side sales arrangement of bottom fish in Tuvalu</p>	<p>1 Baseline data provided on species composition of bottomfish resources, distribution of fishing grounds expected catch rates and estimates of the maximum sustainable yields</p> <p>2 Bottomfish management plan based on analysis of five years bottomfish catch and survey data</p> <p>3 Information provided on most appropriate fishing methods and feasibility of profitable operation of small scale commercial fishery</p> <p>4 If profitable and sustainable catch levels are achieved, a fleet of ten small scale commercial vessels operated by Tuvaluans is established by PACD If the mothership over the side sales arrangements is not profitable fishing rights are sold to foreign based fishing operators</p>	<p>1 Consultant/Fisheries Division published reports in bottomfish resources stock assessment</p> <p>2 Consultant/Fisheries Division published reports bottomfish management plan</p> <p>3 Contractor semi annual and final report on viability of bottomfish strategy</p>	<p>1 Suitable experienced fishing operators can be found to invest their time and money in small scale offshore fishing ventures</p>

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NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>INPUTS</u>			
<u>A I D</u> 18 months of short-term technical assistance (boatbuilder, naval architect marine engineer biologist), 6 years long term training, short term training, 12 months charter of vessel for resource survey	Type of Input U S Short term T A 245 Local Long term T A 72 100 Admin/Operating costs 18 40 Training 93 Vessel Charter 180 280 Commodities 75 Training Facilities 40 Total 683 460	1 AID and GOT records 2 Annual PIRs and project reviews 3 Contracts and cooperating agreements 4 Survey of GOT inputs	
<u>GOT</u> Two counterpart research staff, six fisheries training vessels use of training facilities and project support			

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Fishing grounds for these stocks have been partially identified by a Japanese survey fishing project in 1984/86 and by occasional fishing by visiting fisheries specialist from the South Pacific Commission. The size of the stocks and the likely sustainable yields are uncertain, but are estimated to be in the range of 250-400 metric tons per annum, representing potential long-term gross yields of between \$500,000 and \$700,000 per year.

The regional purpose is to demonstrate a strategy for the establishment of a sustainable bottomfish fishery within a strong framework of resource management. If this approach is successful in Tuvalu, it will demonstrate a strategy which can be applied elsewhere in the South Pacific.

III PROJECT ELEMENTS

The Tuvalu component has three major elements: a) bottomfish resource assessment and management, b) testing of new fishing technologies, and c) small-scale boatbuilding.

Resource Assessment

Three data elements are required to assess the Tuvalu bottomfish resource: 1) data on slope and seamount fisheries obtained from Tuvalu and similar locations in the past, 2) data collection from the developing fishery, and, 3) resource assessment cruises. Comparisons of deep water resources have been accomplished by the U.S. National Marine Fisheries Service, especially between the Northern Marianas and Tonga. As conditions are similar, some extrapolation can be done to give a rough stock indication, when compared to the bottom topography. This gives a starting point for Tuvalu bottomfish stock assessment. Data from the fishery is gathered, indicating species, length frequency, location, etc. Then, assessment cruises verify the port sampling data. To make most effective use of monetary resources and time, a bottomfish stock assessment specialist will be secured for one month in three successive years to design the sampling regime, and to assist in data analysis. Further, a vessel will be chartered for six months in each of two successive years to conduct stock assessment cruises. The team leader will be responsible for maintaining data flow and quality. The ultimate use of the resource assessment data will be to determine MSYs (maximum sustainable yield) for the fishery as input to the management plan for Tuvalu's bottomfish fishery. A review of the resource assessment will be made by Tuvalu's Fisheries staff, the

Contractor, A I D staff and regional fisheries personnel to determine the opportunities for the expanded development of this fisheries resource

Fishing Methods

The project will introduce offshore fishing for deep bottomfish. Initially, this may be undertaken using six 9 meter boats, which were recently provided by Japanese aid, or similar vessels provided by the private sector. In addition, a mothership for offloading catch will be provided by the private sector. The Japanese vessels are not fully suitable, as they are undersized for the fishery, overpowered, and have a low fuel capacity. A review is being made to determine if these vessels can be modified to meet the needs of the proposed activity. A boat similar to that being tested in Tonga, of thirty-five foot length, is likely to be more suitable. This will also allow longline fishing for tuna as an alternative, and as part of the management strategy for bottomfish. Bottom fishing methods will be tried and altered appropriately for the vessel in use. The same is true for longlining. The Tuvalu and Tonga components are thus closely linked.

Boat Design and Building

A naval architect will consult on the project for three months, and a boat builder will assist for six months over two years. A prototype vessel will then be built for use in the fishery. This will be accomplished in the Tuvalu boatyard.

Training

An additional element for the project component is training. On the job training will be part of the terms of reference of short term TDYs, which includes a) fisheries biologist, 2) naval architect, 3) boatbuilder, and 4) marine engineer. In addition, six study tours are allocated for specialized training, with the specific training to be determined by qualifications of counterparts and needs. Finally, two long-term scholarships for fisheries training at a local institution, such as the University of the South Pacific, are included.

IV LONG-TERM SUSTAINABILITY CONSIDERATIONS

The major long-term issue is the sustainability of the bottomfish resource. The primary reason for the component is to rationaly utilize the resource, meaning development of appropriate and workable management strategies. This includes construction of only those vessels which can tap the MSY without over-fishing. It is likely that a limited number of vessels will be able to do this. As an alternative, to more fully utilize vessels built for the bottomfish fishery, longlining for tuna is envisioned. In both cases, the primary focus is the export market. With proper management, appropriate infrastructure, and export market development, long-term sustainability is likely.

The major social consideration for sustainability is the willingness of Tuvaluan fishing families to have members at sea for the longer periods of time needed to make the bottomfishing economically viable. The project will carefully monitor participation and turnover rates for boat crews to satisfy this concern.

Sustainability of economic aspects of the Tuvalu activity seems assured. On the analysis set out in Annex H, establishment of small scale offshore bottom fishing in Tuvalu has a strong chance of providing attractive returns to local fishing operators. At worst, if the over the side sales arrangement prove not to be viable, and it is not possible to establish Tuvalu fishing operators in larger vessels which can land fish for export in Fiji, the Government of Tuvalu will be able to license foreign fishermen to exploit the resources for fees. In this case, the data from the resource assessment component of the project will be critical to enabling the government to secure appropriate returns and avoid depletion through over-fishing.

As set out in Annex G, the project will not leave any requirement for additional recurrent expenditure by the Government of Tuvalu, and might provide a source of additional government revenue.

V ISSUES FOR PROJECT IMPLEMENTATION

The primary issues are resistance by the Tuvaluan government to foreign fishing interests which may push to tap bottomfish resources before management strategies can be fully developed and adopted. Since government revenues are scarce and employment opportunities limited, protecting this resource as the industry develops will be crucial.

VI KEY ACTIVITIES TO BE MONITORED

Priority outputs to be emphasized by ongoing monitoring systems by the project implementors include the following:

- Determination of MSY and establishment of management plan for bottomfishing
- Research and development of optimal fishing methods for small-scale offshore bottomfishery
- Determination of viability of commercial-scale bottomfishery

Bottomfish stock assessment can draw upon previous data collected from Tuvalu and similar locations, data collection from the developing fishery, and a twelve-month resource assessment. Determination of the commercial viability of the bottomfishing will require development of a vessel operating cost model, compared to gross sales data supplemented by focus group interviews with vessel operators and crew on profitability.

VII. POTENTIAL IMPACT OF PROJECT

The principal impact of this component will be on the basic economy of Tuvalu. Although the potential value of annual catch is estimated at only US\$217,000, for a tiny nation, nearly totally dependent on foreign aid, this amount can be of significant importance. It would increase the value of the fisheries catch by 90%, and raise the value of the fisheries

sector from 14% to 24% of the total economy. Gainful employment would increase by 65 positions, in a nation which gainfully employs only 1100 persons. In establishing a small scale offshore fishery in southern Tuvalu, the project will also provide the basis for roughly doubling these gains with catches from northern Tuvalu waters, and for substantial further gains if small scale longlining techniques to be tested in the Tonga component of the project prove successful and can be applied in Tuvalu.

VIII. COUNTRY COMPONENT BUDGET

Table E-9 sets out the proposed budget for the Tuvalu component based on estimates of levels of effort set out in Section III above. Table E-10 sets out the proposed contribution by the Government of Tuvalu.

Table E-9

		Detailed Estimates of A I D Costs				Tuvalu			
		1990	1991	1992	1993	1994	Total		
				(\$000)			LCP		
1	Technical Assistance (1)								
		<u>Person</u>	<u>Trips</u>						
		<u>Months</u>							
	a) U S Short-term								
	Boatbuilder	4	2	38	38		76		
	Naval Architect	3	1	54			54		
	Marine Engineer	4	2	38	38		76		
	Marine Biologist (4)	3	3	13	13	13	39		
	Sub-Total	18		13	143	89	245		
	b) Local Long-term								
	Project Manager	36		23	24	25	72		
	c) Admin/Operating Costs								
	Support Costs			8	5	5	18		
2	Training (2)								
	a) Long-term			8	16	16	8	48	
	b) Short-term			5	5	5	15		
	c) Study Tours/Attach			10	10	10	30		
3	Vessel Charter (3)	<u>Vsl Mths</u>							
		12		90	90		180		
4	Commodities								
	FADS				25		25		
	Fishing Gear			10	10	10	30		
	Scientific Eqpt			5	15		20		
	Sub-Total			15	50	10	75		
	Component Total			13	302	289	71	8	683

NOTES

- (1) See Annex G (Section IV) for technical assistance cost rates
 (2) Training costs - two three year diplomas at the University of the South Pacific \$8000 per year
 (3) Charter Vessel Costs.

	<u>\$ per month</u>
crew	\$3,500
vessel	6,500
operating costs	<u>5,000</u>

Total 15,000

- (4) Assumes NMFS marine Biologist

Table E-10

Estimated Host Country Contribution Tuvalu

	1990	1991	1992 (\$000)	1993	1994	Total LOP
1 Long-term Counterparts						
Project Manager (half time)	3	3	3	3	3	15
Research Officer (half time)	4	4	4	4	4	20
Statistician (half time)	3	3	3	3	3	15
Technicians	10	10	10	10	10	50
Sub-Total	20	20	20	20	20	100
2 Admin/Operating Costs	8	8	8	8	8	40
3 Training Vessels (1)		70	70	70	70	280
4 Facilities	15	15	10			40
Component Total	43	113	108	98	98	460

NOTE

- (1) Six training vessels capital value \$560,000, assumes eight year life capital value of \$70,000 per year

ANNEX F

REGIONAL IMPACT COMPONENT

I BACKGROUND

The five national pilot components of the project are individually targeted on generating sustainable measurable economic gains for the communities involved. But they have also been selected to have potential for important applications elsewhere in the region to multiply the benefits of the project. The project will therefore include a sixth component - the regional impact component - to promote replication in other countries in the region of technologies developed under the project and to disseminate project results.

There is a well-established framework of regional cooperation in marine resources activity in the region. The major focal points are the regional organizations, particularly the South Pacific Forum Fisheries Agency (FFA), the South Pacific Commission (SPC), and the University of the South Pacific (USP). The Mission has strong working relationships with these institutions. A number of U.S. institutions including the U.S. National Marine Fisheries Service, U.S. PVOs active in the region and a number of U.S. universities also have well established working relationships with the regional organizations and with A.I.D. The strength of these various institutions, and the relationships between them provide a favorable setting for the wider regional application of the results of the five bilateral components of this project.

II PROJECT OBJECTIVES

The regional impact component shares the same goal with all the other components of the project.

Its purpose is to promote the wider regional application of the technologies and strategies which are demonstrated by the country components of the project. It will actively seek to encourage replication of any components which show promising technological and economic results.

PACIFIC ISLANDS MARINE RESOURCES

FIGURE F 1 LOGICAL FRAMEWORK REGIONAL COMPONENT

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<p><u>PROGRAM OR SECTOR GOAL</u></p> <p>Increase income generating opportunities for men and women within the Pacific Islands through means which enhance the conservation of national resources</p>	<p><u>MEASURE OF GOAL ACHIEVEMENT</u></p> <p>1 Increase in numbers of men and women engaged in marine resource production pilot activities</p> <p>2 Estimates of potential yields and earnings</p>	<p>Project assisted studies and consultations with Island governments</p>	
<p><u>PROJECT PURPOSE</u></p> <p>To promote wider regional applications of technologies demonstrated by the components of the project</p>	<p><u>END OF PROJECT STATUS</u></p> <p>Private entrepreneurs or governments initiate pilot marine resources management and development technologies and strategies in other countries</p>	<p>1 Government reports and legislation related to marine resources management</p> <p>2 Survey of government knowledge of public or private initiatives related to project activities</p>	<p>1 Pilot strategies have regional applications</p>

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PACIFIC ISLANDS MARINE RESOURCES

LOGICAL FRAMEWORK REGIONAL COMPONENT PAGE 2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
<u>OUTPUTS</u>			
1 Dissemination of the results of the five pilot activities to other countries in the region 2 Limited number of pilot activities are initiated in other countries of the region	1 Workshops publications study tours, seminars, and short term technical assistance are under taken as needed to disseminate results of pilot activities 2 Two or three of the project assisted pilot activities initiated elsewhere in the region by private sector	Project records grantee participant trainee and consultant reports	Regional organizations cooperate in component implementation
<u>INPUTS</u>			
1 Funding for regional organization sponsored special studies workshops and study tours 2 Short term technical assistance and participant training study tours 3 Full time PSC regional fisheries analyst	<u>A I D</u> Direct contract (\$440,000) Participant training and grants to regional organizations (\$360,000) <u>Regional Organizations 25%</u> (\$120,000) in kind match for local contribution	A I D records Regional organizations reports Contracts and Cooperative agreements PIO/P training reports	

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The outputs of the component will be

- 1) Dissemination of the results of the five pilot activities to other countries in RDO/SP region
- 2) A limited number of pilot activities to replicate major project activities in other countries of the region

III PROJECT ELEMENTS

The two outputs of the component will be structured as follows

- 1) Dissemination of the project results

There are well established mechanisms for dissemination of information in the region. The SPC and the FFA hold annual technical meetings reviewing in the case of SPC issues on the area of research and fishing methods and in the case of FFA, fisheries policy and management. These organizations also organize ad hoc workshops, meetings and seminars on particular issues and have ongoing programs of arranging study tours and short-term technical assistance. These activities are often undertaken jointly with other organizations such as FAO, the Commonwealth Secretariat, the International Centre for Living Aquatic Resources Management, regional and Pacific rim universities and bilateral donors. The USP, the SPC and the FFA are also presently implementing the Pacific Islands Marine Resources Information Service (PIMRIS) to improve access to available information in the sector. Rather than develop duplicate dissemination mechanisms, the project will make information available regularly to existing organizations and only fund activities which are not already provided for by these groups and which may be needed to be sure project outcomes are used in a timely way. These activities will include short-term technical assistance, training including study visits, workshops, and publications.

- 2) Replication of project-funded pilot activities in other countries. The broader dissemination element of the regional activity described above will be supplemented by more targeted assistance to establish small pilot activities. This assistance will largely include short-term technical assistance, training and materials for trial operations.

The following tables set out the results of a preliminary analysis to summarize the prospects for replicating the project assisted activities according to three major criteria

resources relating to the availability of underutilized resources,

market areas relating to the quality and cost of transport sources to export markets, and the size of domestic markets,

level of fishery development relating to the capacity of local private fishing operators and public sector marine resource managers to adopt project supported technologies and strategies

KEY H = HIGH M = MEDIUM L = LOW

COOK ISLANDS PEARL OYSTER CULTURE REPLICABILITY

COUNTRY	CRITERIA		
	RESOURCES	MARKET ACCESS	LEVEL OF FISHING DEVELOPMENT
Cook Islands	-	-	-
Fiji	M	H	H
Kiribati	M	H	M
Niue	L	H	L
Papua New Guinea	H	H	M
Solomon Islands	H	H	M
Tonga	M	H	M
Tuvalu	M	H	L
Vanuatu	M	H	L
Western Samoa	L	H	M

TUVALU BOTTOMFISH DEVELOPMENT REPLICABILITY

COUNTRY	CRITERIA		
	RESOURCES	MARKET ACCESS	LEVEL OF FISHING DEVELOPMENT
Cook Islands	L	M	M
Fiji	M	H	M
Kiribati	M	L	L
Niue	M	L	L
Papua New Guinea	H	M	L
Solomon Islands	H	M	L
Tonga	L	M	H
Tuvalu	-	-	-
Vanuatu	M	M	H
Western Samoa	H	H	H

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TONGA SMALL-SCALE TUNA LONGLINING REPLICABILITY

COUNTRY	CRITERIA		
	RESOURCES	MARKET ACCESS	LEVEL OF FISHING DEVELOPMENT
Cook Islands	M	L	M
Fiji	M	H	M
Kiribati	H	L	L
Niue	M	L	L
Papua New Guinea	H	M	L
Solomon Islands	H	L	L
Tonga	-	-	-
Tuvalu	H	L	M
Vanuatu	M	L	M
Western Samoa	M	M	H

PAPUA NEW GUINEA COASTAL FISHERIES DEVELOPMENT REPLICABILITY

COUNTRY	CRITERIA		
	RESOURCES	MARKET ACCESS	LEVEL OF FISHING DEVELOPMENT
Cook Islands	M	M	H
Fiji	L	H	H
Kiribati	M	L	M
Niue	M	L	M
Papua New Guinea	-	-	-
Solomon Islands	H	M	M
Tonga	L	H	H
Tuvalu	H	L	M
Vanuatu	M	M	M
Western Samoa	L	H	H

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KIRIBATI ATOLL RESEARCH REPLICABILITY

COUNTRY	CRITERIA	
	PRESENCE OF ATOLLS	RESOURCE PRESSURE
Cook Islands	M	M
Fiji	M	H
Kiribati	-	-
Niue	L	M
Papua New Guinea	M	L
Solomon Islands	M	L
Tonga	H	H
Tuvalu	H	M
Vanuatu	L	M
Western Samoa	L	H

IV COMPONENT BUDGET

The Detailed Estimates of A I D Costs for the regional impact component is set out below in Table F-1

Table F-1

Detailed Estimates of A I D Costs Regional

			1990	1991	1992	1993	1994	Total LOP
			(\$000)					
1	Technical Assistance (1)							
		Person Mths						
	a) Long-term (2)	57	68	90	92	94	96	440
	b) U S Short-term	Trips						
	Professional	8 8		40	40	40	40	160
	Other	8 8		29	29	29	29	116
	Sub-Total	16 16		69	69	69	69	276
2	Training							
	Study Tours			5	9	10	10	34
3	Commodities			5	10	10	5	30
4	Publications			5	5	5	5	20
	Component Total		68	174	185	188	185	800

NOTES

(1) See Annex G (Section IV) for technical assistance cost rates

(2) Assumes Pacific Island (PSC)

	(\$)
Salary	30,000
Other Benefits	23,000
Travel etc	<u>35,000</u>

Total 88,000 in year 1,

(Assumes 9 months of 1990)

ANNEX G

FINANCIAL ANALYSIS

I INTRODUCTION

Detailed budgets for the separate country components of the project are set out in Annex E. Standardized summary budgets derived from this data are set out below.

Sustainability issues including those relating to the capacities of most governments to meet planned contributions to the project, and the longer term capacities of governments to maintain activities that need to be carried on beyond the end of the project if planned project gains are to be sustainable, are considered separately for each country component in Annex E, but are also summarized below.

The financial viability of private enterprises which would be assisted by the project are described in the economic analysis in Annex H.

II RECURRENT COST ANALYSIS

The project is targeted at private sector development, and therefore is designed to make the minimum requirement for ongoing government recurrent expenditures. The only significant additional long-term recruitment costs, and they are small, arise where development of private sector marine resource activities is expected to lead to long-term increases in recurrent expenditures for public sector programs to conserve a marine resource from the effects of over-exploitation. The situation with respect to recurrent expenditure plans for the marine resources sector in project location countries is as follows.

COOK ISLANDS

The policy of the government in the five-year plan extant is to "-foster the development of pearl farming operations "

The Cook Islands marine resource development budget showed a marked increase in the 1986/87 year to \$630,500 or 37% of the total from the lower levels of the five prior years. Recurrent expenditures were at \$100,000 for the 86/87 year and increased to \$120,000 in 87/88. An increasing government concern for the marine resources sector is apparent in these changes, and also in their establishment of a Ministry of Marine Resources.

Assistance from New Zealand, which was \$6 million (17% of the Cook Islands budget) in 1988, is beginning a twenty year phase out in 1989. This places self-reliance at the center of Cook Islands policy. Marine resources will play a major part in attaining this condition.

After the project, the GOCI is expected to incur additional recurrent costs of around \$100,000. However it is expected to have the capacity to generate receipts substantially exceeding this amount from taxes on pearl farming activity, although it has not yet formulated a strategy for this purpose.

PAPUA NEW GUINEA

Present GPNG policy attaches a high priority to fisheries development generally and to small-scale fisheries development in particular. In 1986 a new separate Department of Fisheries and Marine Resources was established in recognition of the large underdeveloped marine resource potential and recent good performance in the marine resources sector. From 1986 to 1988, recurrent budget appropriations for fisheries and marine resources increased from US\$2 million to US\$3 million and the staff ceilings were increased from 185 to 233. Further growth

to an established staff of 275 is indicatively approved for 1992. In practice the Department has had trouble taking up the expanded role proposed for it because of the shortage of trained people that characterizes every sector in Papua New Guinea. By the end of 1988 around 71 established positions were vacant, filled by expatriates, or temporarily filled by staff with lower qualifications and experience than required. Department training and recruitment plans aim at a substantial strengthening of capacity over the next five years.

Of particular significance for this project is the planned strengthening of the Department's fisheries extension work. A new Extension division will be established for which the government is requesting a program of long-term technical assistance from the FAO/UNDP Regional Fisheries Programme. The present fisheries extension service is largely limited to a programme of development of locally built small-scale fishing craft. The Government will be looking to the results of the A I D project as a basis for its strategy for strengthening its extension activities across Papua New Guinea.

The project itself is not expected to lead to any increase in recurrent expenditures for the GPNG. The impact of the project areas of PNG outside the project site areas will depend on the capacity of the national and provincial administration to carry project results through extension services. There will also be an increased need for analysis of data on the impact of fishing on coastal resources. These needs are expected to be able to be achieved within the existing plans for provincial and national fisheries and marine resources administration budgets.

TONGA

"The fisheries sector is one of the most important sectors in the economy because of its rich resources. The resources will be utilized to provide benefits to the people in terms of employment and incomes."

Those words from the Budget Statement for 1989-90 of the Hon J C. Cocker of the Kingdom of Tonga reflect the determination of the government to continue its program of fisheries development.

The development potential of the tuna sector does not depend upon recurring government expenditure although the services of the Development Bank of Tonga will doubtless be used by fishermen seeking additional capital. Since the tuna boat owners will come from the ranks of the deep water demersal fishermen they will have available capital in their boats, real property and savings that the better fishermen have accumulated from fishing and land based economic activity. With the useful business experience of fishing and farming they are far better prepared to take on new ventures than they were at the beginning of the bottom fishing experience.

The implementation of a management plan for the bottomfish fishery will be undertaken by staff in positions already established without additional recurrent costs.

TUVALU

With few other resources, the Government of Tuvalu gives highest priority to exploitation of the resources of the sea in the country's development strategy. Even so, the government has very little capacity to finance new activities from its recurrent budget for fisheries which is less than \$100,000 per year. There will be no additional recurrent expenditures beyond the end of the project. The only ongoing task for the government administration will be the implementation of a bottomfish conservation and management strategy which can be accomplished with presently established staff.

III. PROJECT FINANCIAL ANALYSIS

Budgets for the separate project components and a total project budget are set out below in Table G-1 with associated assumed unit cost rates for technical assistance. These budgets are derived from the component analyses in Annex E.

A summary of the host country contributions also derived from the analyses in Annex E is set out in Table G-2.

The only significant project budget issue is that of the provision of transport services for the pearl oyster activity in the Cook Islands. This issue is analyzed in Annex E.

Table G-1

Estimates of A I D Costs

A	COOK ISLANDS	1990	1991	1992 (\$000)	1993	1994	Total IOP
1	Technical Assistance (1)						
	a) Long-term (6 5 P/yrs)	39	310	332	334	42	1047
	b) Short-term (18 P/mths)		112	112	112		336
	c) Local Long-term						
	d) Local Short-term						
	e) Admin/Operating Costs						
2	Training						
	a) Long-term						
	b) Short-term	10	5	5	5		25
	c) Study Tours						
3	Charter Vessels		200	200	200		600
4	Commodities	50	50	50			150
5	Construction	100	100	40			240
6	Other						
	COOK ISLANDS TOTAL	199	777	729	651	42	2398

Table G-1 (continued)

B KIRIBATI		1990	1991	1992	1993	1994	Total LOP
		(\$000)					
<hr/>							
1.	Technical Assistance (1)						
	a) U S Short-term (41 P/mths)		210	167	190	33	590
	b) Local Long-term		47	49	52	54	202
	c) Local Short-term		15				15
	d) Admin/Operating Costs		5	5	5	5	20
2	Training						
	a) Long-term						
	b) Short-term						
	c) Study Tours						
3	Charter Vessels						
4	Commodities		48	12	10		70
5	Construction						
6	Other		15	20	20	20	75
<hr/>							
KIRIBATI TOTAL			330	253	277	112	972
<hr/>							

Table G-1 (continued)

C PAPUA NEW GUINEA		1990	1991	1992 (\$000)	1993	1994	Total LOP
1	Technical Assistance (1)						
	a) U S Long-term (12 5 P/yrs)		434	823	742	97	2096
	b) U S Short-term (23 P/mths)	141	76	58	68		343
	c) Local Long-term						
	d) Local Short-term	5	5	10	10	5	35
	e) Admin/Operating Costs	13	48	50	37	17	165
2	Training						
	a) Long-term			25	25		50
	b) Short-term	5	30	40	40	10	125
	c) Study Tours			40			40
3	Charter Vessels						
4	Commodities	25	104	75	34		238
5	Construction						
6	Other		15				
PAPUA NEW GUINEA TOTAL		189	697	1121	956	129	3092

Table G-1 (continued)

D TONGA		1990	1991	1992 (\$000)	1993	1994	Total LOP
1	Technical Assistance (1)						
	a) U S Long-term (7.5 P/yrs)	201	519	433	200		1353
	b) U S Short-term (25 P/mths)	74	54	252	20		400
	c) Local Long-term	12	23	24	16		75
	d) Local Short-term						
	e) Admin/Operating Costs	20	12	12	8		52
2	Training						
	a) Long-term		8	33	33		74
	b) Short-term		15	15	15		45
	c) Study Tours						
3	Charter Vessels	28	36	66	18		148
4	Commodities	70	84	31	5		190
5	Construction						
6	Other						
TONGA TOTAL		405	751	866	315	0	2337

Table G-1 (continued)

E TUVALU		1990	1991	1992	1993	1994	Total LOP
		(\$000)					
1	Technical Assistance (1)						
	a) U S Long-term						
	b) U S Short-term (18 P/mths)	13	143	89			245
	c) Local Long-term		23	24	25		72
	d) Local Short-term						
	e) Admin/Operating Costs		8	5	5		18
2	Training						
	a) Long-term		8	16	16	8	48
	b) Short-term		5	5	5		15
	c) Study Tours		10	10	10		30
3	Charter Vessels		90	90			180
4	Commodities		15	50	10		75
5	Construction						
6	Other						
TUVALU TOTAL		13	302	289	71	8	683

Table G-1 (continued)

F REGIONAL IMPACT COMPONENT		1990	1991	1992 (\$000)	1993	1994	Total LOP
1	Technical Assistance						
	a) Long-term	68	90	92	94	96	440
	b) Short-term (16 P/mths)		69	69	69	69	276
	c) Local Long-term						
	d) Local Short-term						
	e) Admin/Operating Costs						
2	Training						
	a) Long-term						
	b) Short-term						
	c) Study Tours		5	9	10	10	34
3	Charter Vessels						
4	Commodities		5	10	10	5	30
5	Construction						
6	Other		5	5	5	5	20
REGIONAL IMPACT TOTAL		68	174	185	188	185	800

Table G-1 (continued)

G PROJECT TOTAL		1990	1991	1992	1993	1994	Total LOP
		(\$000)					
1	Technical Assistance						
	a) Long-term (27 P/yrs)	308	1353	1670	1370	235	4936
	b) Short-term (140 P/mths)	228	654	747	459	102	2190
	c) Local Long-term (10 P/yrs)	12	93	97	93	54	349
	d) Local Short-term	5	20	10	10	5	50
	e) Admin/Operating Costs	33	73	72	55	22	255
2	Training						
	a) Long-term		16	74	74	8	172
	b) Short-term	15	55	65	65	10	210
	c) Study Tours		15	59	20	10	104
3	Charter Vessels/Transport Services	28	326	356	218		928
4	Commodities	145	306	228	69	5	753
5	Construction	100	100	40			240
6	Evaluation/Audits		25	100	25	100	250
7	Project Coordination	86	118	122	126	130	582
8	Other		20	25	25	25	95
	Sub Total	960	3174	3665	2609	706	11,114
	Contingencies (5%)	48	159	183	130	36	556
	Inflation (4% p.a)		130	280	310	110	830
	PROJECT TOTAL	1008	3463	4128	3049	852	12,500

Table G-2

Aggregate Host Country Contributions

(\$000)

	1990	1991	1992	1993	1994	Total LOP
Long-term Counterparts	80	221	221	221	210	953
Admin/Operating Costs	38	58	58	58	58	270
Facilities (1)	473	134	113	48	48	816
Vessels/Transport Services	110	255	340	340	235	1280
Commodities (2)	166	196	276	326	366	1330
Other (3)		30	30	30	30	120
Sub Total	867	894	1038	1023	947	4769
Contingencies (5%)	43	45	54	51	47	240
Inflation (4% p a)		40	90	120	150	400
TOTAL	910	979	1182	1194	1144	5409

NOTES

- (1) Construction and imputed rent of existing facilities
- (2) Includes private sector pearl farm material costs
- (3) Regional impact component contribution by regional organizations

IV TECHNICAL ASSISTANCE COST RATES

The financial analysis was prepared using separate cost rates for professional experts such as scientists, economists and other technical experts such as boatbuilders and fishing specialists. The cost rates also vary by country of location with variations in items such as housing and travel. The set of cost rates used was as follows

Table G-3

Long-term Technical Assistance Cost Rates

A Professional

Item	Cook Islands	Papua New Guinea (\$ per year)	Tonga	Tuvalu
Salary	55,000	75,000	75,000	N/A
Overhead (100%)	55,000	38,000 (3)	75,000	N/A
Other Direct costs (1)	45,000 (2)	80,000 (4)	60,000	N/A
Total Year 1	155,000	193,000 (5)	210,000	N/A
Year 2	161,000	193,000	219,000	N/A
Year 3	167,000	193,000	228,000	N/A
B U S Other				
Item				
Salary	N/A	45,000	45,000	45,000
Overhead (100%)	N/A	25,000 (3)	45,000	45,000
Other Direct Costs (1)	N/A	74,000 (4)	54,000	54,000
Total Year 1	N/A	144,000	144,000	144,000
Year 2	N/A	150,000	150,000	150,000
Year 3	N/A	155,000	155,000	155,000

NOTES

- (1) Generally includes education allowance \$20,000, post differential (15 per cent of salary), shipping \$10,000, housing utilities and furniture \$10,000 and travel costs as appropriate
- (2) Excludes housing, utilities and furniture which will be provided at the Suwarrow station
- (3) Assumes Cooperative Agreement with PVO or university with 50 per cent overhead rate
- (4) Includes additional \$20,000 for higher housing utilities and furniture costs in PNG.
- (5) Does not include 5 per cent per annum salary increase because A I D maximum salary is assumed for first year

Table G-4

Short-term Technical Assistance Cost Rates

A U S Professional

Item	Kiribati	Papua New Guinea (\$ per year)	Other Components
Salary	4,200	7,000	7,000
Overhead	2,000 (2)	3,500 (3)	7,000
Per Diem etc	3,000	4,500	3,000
Total Monthly Costs plus Travel costs etc per trip	9,300 3,000	15,000 3,000	17,000 3,000
B U S Other			
Item			
Salary	N/A	4,200	4,200
Overhead	N/A	2,100 (3)	4,200
Per Diems etc	N/A	4,700	3,100
Total Monthly Costs plus Travel costs etc per trip	N/A N/A N/A	11,000 3,000	11,500 3,000

NOTES

- (1) Assumes Cooperative Agreement with U S university overhead rate 50 per cent
 (2) Assumes Cooperative Agreement with U S university or FVO overhead rate 50 per cent

C Local

Item	Kiribati Research Assistant	Kiribati Marine Resources Advisor (\$ per year)	Other (1)
Salary	5,000	18,000	12,000
Overhead (2)	2,500	9,000	6,000
Other Direct Costs (3)	2,500	5,000	5,000
Total Year 1	10,000	32,000	23,000
Year 2	10,500	34,000	24,000
Year 3	11,000	36,000	25,000

NOTES

- (1) Tonga Operations Manager, Tuvalu Fisheries Development Advisor
 (2) Overhead for locally hired personnel, 50 per cent
 (3) Travel and training

ANNEX H

ECONOMIC ANALYSIS

In the past ten years the world has reached the stage of virtually full exploitation of readily marketable stocks of marine resources. The demand for fishery products is certain to increase strongly in the next few decades. Owing to population growth, increased incomes in much of the world, and increased appreciation of the nutritional benefits of eating fish, the potential for world per capita consumption is projected by FAO officials to increase from current levels of about 12.5 to 15.1 kg in the year 2000. This translates into a global demand for fish in the year 2000 of over 113 million metric tons (mmt), compared with 85 mmt produced in 1985.

The tremendous world-wide increases in demand for fish caused landings of fish in the 1950s and '60s to increase from 20 to 65 mmt, an average of about 6 per cent per year. In the 1970s, this rapid advance in fish harvests came up against the barrier of resources limitations, as one by one nearly all the fish stocks became fully exploited. As a result, the annual rate of increase slowed to less than 2 per cent. Landings in 1985 were 85 mmt, of which about 75 mmt were from marine catches and 10 mmt from fresh water, including aquaculture. As a consequence of natural limits to the fertility of ocean waters, production of fish from the world ocean is expected to level off at about 100 mmt. Aquaculture does not have the same constraint, but the base of aquaculture is small, about 10 per cent of world harvests, therefore harvests from wild stocks will continue to dominate fish production for many decades.

Significant changes have been taking place during the past decade in the world tuna fisheries. Catches by developing countries have increased 40 per cent during the 1980s, while catches by traditional tuna nations (such as Japan and the United States) declined from 75 to 69 per cent of the total. The proportion of the world production of canned tuna processed by developing countries has quadrupled since 1979, reaching three per cent of the world's total. Several large tuna companies have transferred their canneries from developed to developing countries in order to be in closer proximity to fishing grounds and to take advantage of lower labor costs.

These conditions set the stage for fishing those stocks insulated from over-exploitation by their very remoteness and the fact that they not susceptible of economically sustainable exploitation by large scale and costly means. The island nations of the Pacific are ideally situated to benefit from current conditions. The resources are in their waters and the environments that concentrate these resources around. These concentrations can be effectively exploited once their behavior is understood and appropriate technologies adapted to them.

Earlier A I D support of fisheries projects in several island countries has provided a foundation for the extension of technologies to new new environments in new countries. This experience increases the chances of success through effective adaptation and broadens the experience base for further expansion.

The bottom fish stocks surrounding the Pacific islands and found near reefs and seamounts can be over-exploited even though the scale of operations is not large. The economic sustainability of the projects dependent upon these resources would be imperilled without concomitant stock monitoring of performance and the formulation of effective management plans. This has rarely been an element of fisheries development programs and the result has been that after an early period of prosperity incomes decline as the poverty brought about by declining fish stocks is shared by the fishermen and their families. As prices for the high valued demersal fish continue to rise it may be difficult to restrain new entrants from encroaching onto managed fishing grounds and exploiting managed stocks. A certain national determination is required to sustain fisheries development in prosperity rather than poverty.

The tuna resource is another matter. The resource is a highly mobile one, migrating from place to place but attracted to certain environments at certain times where they can be more readily captured because of their concentrations. The magnitude of the resource and its ability to renew itself dwarf the capacities of small scale operations to damage them. Hence, the fisheries, once established should enjoy a sustained activity in an economic environment offering higher and higher prices.

The economic lure of large scale industrial fisheries based upon real and imagined tuna resources has distracted the attention of many island nations from the real potential of small scale fisheries exploiting demersal resources and the pelagic tuna stocks as well. A realistic appraisal of fisheries potentials recognizes that the resource base is distributed in a way that lends itself well to small-scale exploitation.

The sustainability and economic performance of the country components are evaluated in this annex. The evaluation focuses mainly on the private sector activities since the profitability of private enterprises is central to project success in all cases. The analyses of benefits in estimating the component internal rates of return is based upon the value added by the private sector involved in the country, and does not include public sector costs or benefits. Conservative estimates of potential have been used in evaluating the future benefit stream.

COOK ISLANDS

The potential for black pearl culture in the Cook Islands lies in the Northern Group including Manihiki, where culture has already begun and Penrhyn, Pukapuka and Rakahanga. Suvarrow, the most southerly of the northern islands and also a National Park will be the site of the black pearl research station and the research and training facility.

The profitability of black pearl culture in the Cook Islands has been established by both the private and public initiatives within the past several years with the support of A I D. Farmers in Manihiki have demonstrated both their willingness and ability to grow pearls. The further development of pearl culture is clouded by the lack of coherent policy to manage the lagoon pearl culture systems with a view to sustaining or enhancing productivity and controlling disease. This shortcoming is being corrected by the government who will implement a plan before the project begins.

FINANCE/Microeconomics

One cycle of pearl production has been completed by a group of seven farmers with success rates in the production of pearls ranging from 15 to 34 per cent. Six of the farmers cultivated 2000 seeded pearls and one 10,000. Gross returns ranged from \$1357 to \$6697 among those farmers that cultured 2000 seeded pearls.

A pearl farm requires space in the water column and on the bottom. For continuous crop rotation, that is, an annual harvest, given the growth rate, the farm must have sufficient space and lines for three sets of hanging pearl shells. This fact sets the essential dimensions of investment. In addition space must be provided for seeding pearls and their acclimatization both before and after surgery. A boat is also necessary to give the farmer access to his farm.

The investment funds for pearl production had various sources: fishing, overseas work and government employment among them. The principal investment items consist of buoys and lines the costs of which are substantial when delivered to the northern islands. The investment of buoys and lines which are required for a complete system that would harvest 1500 shells a year (and produce, say, 450 pearls) is about \$2032. A new aluminum boat and motor would add \$4064. At average performance levels this investment would be recovered in four years, at high performance levels in two. A farm producing 10,000 shells a year requires an investment of \$1858.

The major operating cost and matter of singular importance in pearl farming is that of seeding the pearls. The number of qualified technicians are limited and almost all are Japanese although a few Australians have been trained. The farmers must, generally, rely upon agents to obtain the seeding services and to market pearls.

Currently, there are three systems of payment for seeding services in use. One is a cash payment of \$6 (July 1989) per pearl seeded plus all transport and maintenance costs for the technician or \$38 an oyster. A second method reduces the "up-front" costs and requires a payment of \$3 per pearl seeded and one-half of the harvested pearls plus transport and maintenance. The third requires no up-front costs and shares the proceeds equally upon harvest. The latter, if and when available, presents a very attractive opportunity to the farmers since it reduces operating capital requirements by 85 per cent.

Skilled labor inputs are of critical importance to pearl culture and there is ample trainable labor in the area. The essential tasks are spat collection, cleaning, hanging, seeding and harvesting. A farm harvesting 10,000 shells a year has the following annual labor requirements (in person months) spat collection 1-2, three cleanings 3, hanging etc 3+, seeding 1, harvesting 1. This suggests that a 10,000 unit farm would probably constitute a substantial family unit where assistance is available from a daughter or son. The imputed cost of this labor essentially one person year is \$2032 or \$ 20 per oyster.

Maintenance and repair costs cannot be estimated from an existing data base. Given the nature of the materials in use and the environment it is assumed that these costs at 25% of the initial investment are \$8000 or \$ 80 per oyster.

Returns over operating costs for a 10,000 pearl operation are \$24,700 using the recently received average return of \$10 per seeded pearl based upon an average price of \$100/momme (287 grams). The average success rate assumed is thirty per cent. That is 3000 saleable pearls produced from 10,000 shells. However, the price does not reflect a particularly high quality, as might be expected from a new and untried operation involving nine farmers. If one imputes a management and labor cost of \$7000 (twice the skilled labor charge) to yield a net return of \$17,700 and a conservatively estimated annual return to invested capital of 55%.

The greatest potential source of risk is disease. Diseases have been known to strike pearl culture operations with disastrous effect but recent experience in Australia demonstrates that good management and largely sensible sanitary procedures can maintain a disease free environment. With good management the risk is small and the project is designed to provide the research and management backup necessary to it, including visits by farmers to well managed Australian farms.

The question of risk due to weather does not appear to be large. Severe destructive storms (hurricanes/typhoons) have affected none of the northern group more than twice in the past 89 years. However there are periods of heavy weather from October to March that might cause some distress and damage (See below on transport).

The unreliability of transport to the northern group of islands is a major impediment to development. During the period of active pearl shell harvesting and copra operations surface transport was much more regular. However, during the current depressed period in the north transport too has been reduced. The cost to the government of maintaining service to the area at a commercially unprofitable level has caused a large subsidy (over \$115,000 a year). Suitable transport in size and frequency will depend upon the economic development in the north with more passenger traffic and cargoes to be moved. The expansion of black pearl culture to the islands besides Manihiki will increase the demand for surface marine transport.

Because available surface transport is not suitable for project needs or the development of pearl culture generally, a vessel capable of servicing the Suwarow station and providing adequate supplies of store under the project stores program and the transport of project personnel is required. This service will be provided by a commercial charter and will charge competitive commercial rates for non-project services.

Buying agents, pearl seeding technicians, professional advisors and owners who are critical to development of the sector will require transport that is both faster and more reliable than the surface and air travel now provided. Manihiki which is advancing most rapidly has no regular air service and a landing strip (of 1150m poorly compacted coral and a beacon) that is inadequate to serve scheduled air carriers using small planes. With the runway extended to its cleared length of 1400 meters regular service will be provided for a fare of about \$581 return with freight at \$2.32-2.90 a kilogram. Twice monthly air service to Penrhyn which has an excellent landing strip and beacon is hardly adequate to meet the needs for air transport essential to facilitate the development of pearl culture. Air Rarotonga has purchased equipment that can serve the north more effectively provided air strips are improved and maintained. The sustainability of the air service will depend on the development of demand as incomes increase dramatically and business and personal travel needs evolve.

ECONOMICS/Macroeconomics

The project is designed to support the development of the pearl industry through the research support of the management and the direct provision of equipment to the revolving stores. For purposes of proximate analysis of the economic efficacy of private sector development it was assumed that the capacity of Manihiki to produce harvestable shells will reach 246,000 in four years which is near its estimated capacity. The other islands are assumed to reach a 100,000 shell harvest capacity in six years, which is likely to be well below their capacity. The direct domestic annual income generated will be \$1,200,000 from a gross income of \$5,400,000 the remainder largely required to pay for imported inputs.

KIRIBATI

Kiribati, with a population concentrated on one atoll, is beginning to witness the environmental and economic consequences of this congestion so that "With an increasing population there has been a constant erosion of per capita GDP over the years " (Kiribati 1988)

The increasing population at Tarawa and on South Tarawa in particular has placed increased pressure on the lagoon fish and shellfish resources and contributes to the decline in water quality of the lagoon. The rate of growth in the population of South Tarawa has, however, declined in recent years perhaps, " because of cuts in public service employment and attempts to improve conditions on outer islands " Construction of causeways to enhance economic development through improved communications may also irreversibly alter the lagoon environment in ways inimical to the very development they seek to enhance.

The resources of the lagoon are of particular importance in an economy where fish and fishery products are a singularly important source of protein and the full extent of its contribution to employment and income is not known. However,

it is certain that with time the fish and shellfish resources of the lagoon will be over-exploited, protein production will fall, fish prices will rise and incomes will decline. A sad fate. The work of the project economist is essential to provide the economic basis for designing a resource management strategy that will assure the sustained contribution of the lagoon to the island economy and diet.

PAPUA NEW GUINEA

Papua New Guinea is an anomaly among the nations of the Western Pacific in that it has no fishing tradition and fish contributes very little protein to the diet. For these reasons the development of the fishing sector has great potential but is also problematic and the development of fishing, therefore, requires that both the production and distribution system are attended to.

FINANCE/Microeconomics

Production

The development of the coastal fishery is central to the project which will focus on the fishes at the edge of the fringing reefs and the reef slopes using small boats. Locally built wooden snapper boats (on the Kiribati model) costing \$6,000 fully equipped and catching 40 kg per trip will return 59% on invested capital with moderate fishing effort of 125 trips a year. A 4.5 meter glass reinforced plastic skiff

costing \$4,250 fully equipped and catching 25 kg per trip will return 43% on invested capital at moderate effort levels and 53% with a more intensive but still reasonable level of effort. These estimates reflect a very conservative expectation of catch rates, like those currently being obtained using fishing methods of recognized low productivity, like fishing at night for day active fish. The project, by introducing a better understanding of fishing and better methods of fishing to go with that understanding can be expected to increase productivity very substantially hence to increase earnings. The relatively pristine state of the coastal resources in the areas to be developed will contribute to high catch rates as well, and good management will assure that the stocks are not over-exploited.

Markets and Marketing

Having been highland people the Papuans do not have a strong affinity for fish. However as they move to the coastal cities in search of opportunities they are adapting, albeit slowly, to new dietary constituents. Relative to available supplies, the present demand is high as reflected in prices that are high by any standard. It has been estimated (FAO 1989) that demand for fish will continue to increase at the rate of six per cent a year due both to population growth in the coastal areas and increased income. Without increases in production, consumption will be constrained and prices will rise to even more prohibitive levels.

The present market system for domestic fish consists, largely, of fishermen selling fish directly to consumers or other buyers at recognized sites near landing places or at government fish marketing facilities that also supply ice and sell supplies. At some isolated sites the government marketing organization plays the role of middleman in buying fish for later resale, an operation made necessary by the lack of private institutional market infrastructure which is far more critical to market expansion than physical facilities, millions of tons of fish are sold in developing countries without the benefit of elaborate landing, refrigeration and market facilities. However, to manage the effective distribution of quality fish ice is necessary and due to past government projects it is available at the project sites (as are some freezers) but will be supplemented by the project.

Because of the small volumes currently sold the direct sale at retail and wholesale by fishermen is feasible and introduces minimal selling costs. The margins between the first sale by fishermen and a second sale in retail shops is about \$1.21/kg or about thirty per cent of the price. Such a margin is relatively small and only applies to a small proportion of the total volume of fish consumed. With the project development efficient systems of distribution will be developed that will maintain the small margins.

There is no existing data base that permits the analysis of the costs of performing the marketing functions and the physical and institutional system remains to be defined by the market specialist under the project. The system will sell fish locally and not transport fish over great distances (in most cases), will not use sophisticated packaging methods, will freeze fish only incidentally, will sell mostly unprocessed fish or process fish in simple ways (steaks and fillets) if at all. All of this is designed to keep marketing and distributions costs to a minimum consonant with providing a quality consumable product at reasonable prices and maintaining acceptable paying prices to fishermen.

ECONOMICS/Macroeconomics

The technical assistance provided by this project when translated into proven fishing and marketing methods will demonstrate the economic potential of small scale coastal fisheries. Within PNG there are thirteen major population centers on or near the coast with road networks serving nearby coastal areas and in some cases the hinterland. There are also ten minor population centers that share these characteristics. It is not unreasonable to assume that within ten years all of these centers will have benefited from the project developments through an extension program to which the government is committed. With a modest 25 boats operating in each major center and 15 boats in each minor center, with each boat producing 5000 kg of fish a year, the total annual production will be 2,375 m/t which is almost double the current production outside Port Moresby.

That this increase in supply can be absorbed by the market there is little doubt. Experimental efforts to sell fish in areas where it is not customary were met with great success with stocks of fresh fish being immediately purchased at considerable profit to the seller. However, substantially increased supplies may depress market prices at retail and for producers as well.

Increased marketing costs could also reduce producer price although the project is not designed to promote the development of costly infrastructure and convoluted distribution networks. Market costs should remain low as anecdotal information (Lock 1986) suggests they are at about \$ 23 a kilogram that consists largely of fees for use of market space and an imputed charge for a few hours of labor used in selling.

However, because there is no data base to support a detailed assessment of potential market price changes and/or marketing costs the viability of the private sector was examined for a range of market cost and producer price conditions. The current price to producers is around \$2.30/kg. This price was used in the rates of return set out above. If prices fell by 25%, these rates of return would fall by about half, but would still be attractive.

The promise of high and sustainable returns to fishermen with the broad distribution of activity of the major and minor population centers of the country will provide for the direct employment in fishing of a minimum of 950 fishermen. Employment in the input supply sector will increase by 100 as the distribution network for fishing gear and supplies expands to new communities and employment in marketing and distribution will expand by about 125 despite the fact that fishermen will continue to market fish directly. These estimates assume exploitation of demersal fish. If it proves feasible to exploit small pelagics, employment in fishing, processing and marketing would exceed 2000.

TONGA

The fishermen of Tonga have demonstrated a capacity to adapt to new technologies, to accept the risk of new ventures and an ability to accumulate capital in boats, bank accounts and real property. They have also exploited the deep water snapper resources so effectively that resource depletion is a serious possibility. Hence the need for an alternative opportunity to build upon the existing competence and provide new sources of income. The best prospect lies in the exploitation of tuna resources on the seamounts that abound within the jurisdiction of the Kingdom of Tonga.

FINANCE/Microeconomics

There is, of course, no existing data base upon which to base a detailed microeconomic (financial analysis) of a fishing activity that is yet to develop. In consequence the evaluation below is based upon the considered judgment of competent professionals who understand high quality fish marketing, tuna fishing, fishermen's abilities and the tuna resource.

Production

A 35 foot boat, capable of vertical longlining with about 300 hooks costs \$84,000 fully equipped and ready to fish. On trips allowing 4 days of fishing, operating costs excluding crew (labor) are \$508 and gross returns from sales are \$3600 from a catch of 720 kg of tuna assuming a catch rate of 2% and a price of \$5 a kg. With a 60/40 share system the returns above operating costs are divided 60% to the crew and 40% to the boat giving a net return to the boat and management of \$1087 per trip. For a 36 trip year the boat and management will earn \$39125. With an imputed management cost of \$10,000 the return on investment is 35%. This rate of return, which is based upon conservative estimates of productivity, assumes that some of the fish will be sold in the Japanese sashimi market or that frozen high quality tuna loins will be sold in U S markets. The rate of return for canning tuna or for local consumption would be zero.

A 12 meter boat, capable of horizontal longlining with about 600 hooks costs \$142,800 fully equipped and ready to fish. On trips allowing 4 days of fishing, operating costs excluding crew (labor) are \$1667 and gross returns from sales are \$7200 from a catch of 1440 kg of tuna assuming a catch rate of 2% and a price of \$5 a kg. With a 60/40 share system the returns above operating costs are divided 60% to the crew and 40% to the boat giving a net return to the boat and management \$2064 per trip. For a 36 trip year the boat and management will earn \$39,125. With an imputed management cost of \$10,000 the return on investment is 45%. As in the previous case, this rate of return, which is based upon conservative estimates of productivity, assumes that some of the fish will be sold in the Japanese sashimi market or that frozen high quality tuna loins will be sold in U S markets. The rate of return for canning tuna or for local consumption would be 4%.

Marketing

It is of particular importance to this project that high value tuna markets of Japan and the U S be exploited with high quality fish. Not all fish will be suitable for the sashimi market and its very high prices but would be suitable for the high price U S market for frozen tuna loins. Currently, both the Japanese and American markets are being used for the high quality deep water demersal fish catch. The experience gained in this market by several enterprises will be the foundation upon which the tuna market will build. The fishermen are also now capable of producing high quality fish since they have had several successful years of experience in the deep demersal fishery.

The project site in Vava'u is served weekly by ferry to Nuku'alofa and monthly by ship from American Samoa. Surface transport to the west coast of the U S is available every seven weeks from Nuku' Alofa. Cold stores and freezer facilities are available at the landing site. A regular high speed catamaran transport between Vava'u and Nuku'alofa for high quality fish will soon be introduced by a local fish marketing company. Air freight service is available from Nuku' Alofa to Japan and Honolulu although air cargoes originated elsewhere may limit space available to the U S. The facilities and services are sufficient to meet project needs and are the foundation upon which the market and project sustainability depend once the pilot phase is completed.

Recent sashimi prices in Japan set the upper limit on tuna prices and quality with a range for moderate quality in Nagoya from 11 to 17 dollars a kilogram and in Tokyo of \$30 (May 1989) Higher quality fish commands even higher prices but for fish from notably low quality areas obtain lower prices These prices are more than adequate to reward fishermen and merchants for their efforts and to cover the cost of air transport

Prices in Honolulu for yellowfin and bigeye fillets set a market floor for tuna from Tonga and range from \$6 to \$12 a kilogram, prices sufficient at the low level to cover transport and at the upper level to provide high prices to fishermen

ECONOMICS/Macroeconomics

The fishermen of Tonga have demonstrated their capacity to master new technologies and the institutions of government shown a willingness to support them in their development These facts, and the profit potential of the new techniques portend a rapid adoption by the fishermen of the project fishing methods The existing market infrastructure, which has also demonstrated capacity to provide quality fish to demanding markets is capable of supporting increases in production

The potential annual value added by the production activities generated by the project is \$3.3 million This result would be achieved about seven years after private initiatives adopted project techniques and approximately ten years after the initiation of the project Vertical longlining will be adopted first because it is more closely linked to present methods and requires a substantially smaller investment than the more conventional horizontal longlining The investment will be distributed over five years in ten new boats Horizontal longlining will also develop over five years with ten new boats but begin a year later

TUVALU

Tuvalu has yet to capitalize on its marine resources to provide employment and income opportunities for its people Now, Tuvalu stands to benefit from the bottom fishing experience of Tonga that developed with A I D support in a way

that is consonant with the national policy to, " develop a commercial fishing industry based on the sustainable exploitation of all the country's marine resources, involving artisanal, small-scale commercial and industrial fisheries " (Tuvalu 1988) The project will, with a mothership and carrier boat, introduce a system of great potential importance to the island nations of the region where enormous distances are a serious impediment to small scale fisheries development

FINANCE/Microeconomics

The two project components will be discussed separately because each has a different relationship to Tuvalu The vessels that catch the fish will be manned by Tuvaluans and built in Tuvalu while the mothership and carrier boat will very probably be manned by Fijians and maintained there While both components, the catching and processing/transport must be economically viable for the project to sustain itself, the conditions for the private sector are quite different in the two environments

Production

The catching sector, based upon boats 28 feet long and powered with 30 horsepower diesels, costing \$55,000, and required to remain at sea for 60 days per voyage with 40 used for fishing, will produce 7000kg during each voyage (28000 kg/year) to be sold at regular intervals to the mothership standing by At a price of \$1 60 a kg the crew share is about \$21 a person per fishing day for an annual income of \$3240 The return to the boat and management is \$8128 a year but with an imputed management levy of \$5000 the remaining \$3128 yields a 6% return to invested capital Without the management levy the boat gives a 14 7% return The returns to labor are, however, very high for an economy with a GDP per capita of less than \$300 The division of the returns from fishing, assumed here to give 60% of the net stock (gross revenue less operating costs) to the crew and 40% to the boat is assumed and not fixed by custom and obviously a lower crew share would improve the return to capital

The mothership (used), expected to cost \$160,000 after purchase and refitting, will make four voyages of 60 days each during a year and while on station will purchase fish from the catcher vessels and supply them with ice, gear and stores essential to their operations The vessel will also be a transfer point for changing crews when necessary At current

export prices the rate of return on investment is 105% assuming a catcher fleet of ten boats operating at levels indicated above. A ten percent decline in market prices reduces the rate of return to 75% and a 15% decline results in a rate of return of 27%. The mothership-processor is financially quite robust in the face of adverse price or production changes. Unlike the fishing boats, the crew of the mothership do not share in the net returns but are paid fixed wages as if they would be in fish processing plants ashore.

Marketing

The mothership is an integral part of the marketing as well as the production system and essential to both. The fresh iced fish landed by the catchers will be processed for export as fresh whole, frozen fillets or frozen eviscerated headless fish with the fresh fish commanding a price of \$11 in Fiji ready for air shipment to market. The lowest product price is \$6 for frozen eviscerated headless fish. The product mix is transport contained since the fresh fish must leave the mothership soon after landing in order to arrive in Fiji in condition for air transport to high priced markets.

The demand for bottom fish of high quality is strong and growing as has been demonstrated by the development of this kind of fishery in Tonga.

ECONOMICS/Macroeconomics

The 1985 fishing contribution of \$180,000 (5.9%) to a gross domestic product (GDP) of \$3.8 million will be increased by at least \$200,000 to around \$400,000 with the successful deployment of a fleet of only ten vessels. Fishing will then constitute about 23% of the private sector economy of Tuvalu.

Sixty-five new full time equivalent jobs will be created by the fleet of ten vessels and ancillary activities. The actual number of persons involved will be greater with each boat having an expanded crew with some serving at sea while others rest ashore due to the very long voyages.

This analysis is based only on yields from bottomfishing grounds in the southern Tuvalu waters. If fishing on northern seamount fishing grounds proved viable the pattern of gains set out above could be roughly doubled. In the longer term, if the Tonga component of this project is successful, and the over-the-side sales arrangements proposed for Tuvalu prove successful, there would be substantial scope for further expansion of small-scale offshore fishing, as Tuvalu waters are a prime area for catching sashimi tunas.

ANNEX I

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I BACKGROUND AND CONCEPTUAL FRAMEWORK

From a sociocultural perspective, the island nations of the South Pacific region are all involved in the process of modernization. By modernization is meant the changes that occur when hitherto relatively localized sociocultural systems become increasingly linked in a variety of ways to the sociocultural systems outside their areas (Poggie and Lynch 1974, DeWalt and Pelto, 1987). This is a complex process in that each particular modernizing system brings its unique combination of locally evolved sociocultural characteristics to the process and each has different combinations of linkages with the outside world over its history of change.

With modernization comes new modes of resource utilization and production, new forms of organization, and new ways of thinking. These new modes of living can result in an improved life for many, but experience has shown that they can also result in hardship and bewilderment in some portions or all of a population undergoing modernization. This is especially true during periods of rapid and radical change. When this latter condition is severe enough, social unrest, disorganization, and even revolution may follow. It is for this reason that directed change projects, no matter what their scope, must be assessed so as to determine if they have a high potential for causing unacceptable sociocultural disruption.

The five island nations in this project vary considerably in their current degree of overall sociocultural modernization. Papua New Guinea and Kiribati are the least modernized, while Tonga and the Cook Islands are the most. Tuvalu is intermediate. It is useful to consider the social soundness of change projects directed at these countries in the context of the process of modernization, because we are able to draw upon the experience of other cultures which have undergone the process to help identify significant impediments and potential impacts of change. Furthermore, because the conceptual framework of the modernization process is not a mechanistic one, it allows for inclusion of idiosyncratic factors to particular areas in the analysis. All the significant factors uncovered can then be addressed in the design of specific projects of change.

Social soundness analysis in this report is seen as a mechanism by which significant impediments and potential impacts of specific change proposals are identified and addressed at the design stage of project development.

The overall intent of the analysis is to help ensure that the project, when implemented, will have the maximum likelihood of accomplishing its goals and the minimum likelihood of causing negative sociocultural consequences

Pollnac (1981, 1982) has reviewed and summarized the world-wide literature on modernization of small-scale fishermen and Stevenson, Pollnac, and Logan (1982) and Pollnac (1988) provide discussions of the biological, sociocultural, and economic considerations involved in the modernization of small-scale fisheries systems. From these studies it is possible to identify several sociocultural factors of particular importance vis-a-vis the innovations that will accompany the directed change aspects of this project. Factors of particular importance which will be analyzed here include

- a) issues related to acceptance of the innovations
- b) issues related to the impacts of the innovations
- c) safety of the innovations
- d) consequences of the innovations for women and families

II. ACCEPTANCE AND IMPACT OF THE INNOVATION· PEARL AQUACULTURE ON THE COOK ISLANDS

A Intra-Nation Sociocultural Variability

Nations differ in their degree of articulation with the outside world - so too do areas within nations vary in degree of articulation with the nation as a whole. In the Cook Islands there is considerable intra-nation variability in terms of articulation and degree of modernization. This variability is very important in understanding the pattern of acceptance of innovations.

In general, the southern islands - particularly Rarotonga - are now and have been in the past much more linked to the world at large than are the northern islands. On Rarotonga, where the national government is centered, there is continuous radio, telephone, telecommunications, telegraph, airline, and ship communications with the metropolitan outside world. These conduits carry people, capital, information, ideas, goods, and services to and from the islands.

In the northern atoll islands such as Penrhyn, Pukapuka, and Manihiki there is unreliable monthly inter-island trading-ship contact, no phones, and airstrips for small airplanes but no regular air service. Furthermore, the airstrips are frequently unusable because they are in disrepair. It is important to realize that the islands of the north are geographically located some 700 to 900 miles from the capital on Rarotonga and are for the most part quite distant from each other as well. It is not uncommon for travellers from the northern islands to be stranded for weeks at a time. The fifteen Cook Islands, which together comprise only 93 square miles of land area, are spread over an ocean area of about one third the size of the continental United States.

The populations that occupy the northern islands are highly localized. There are many monolingual Cook Island Maori-speaking people in these populations, and facility with other aspects of the national and metropolitan worlds are minimal or nonexistent. Communication at the institutional and interpersonal level with the outside world is minimal.

It is not surprising, that informants describe the lifeways of people on each island as distinctive from each other. These populations appear to have evolved distinct island cultures.

Pukapuka, whose people are ethnically related to the Samoans, has been characterized as being highly "communal". Penrhyn is considered to be populated by very "conservative and cautious" people, while Manihiki, whose people are ethnically related to the Tahitians, is perceived as being characterized by "social volatility".

They also describe the behavior of individuals and institutions in a way that indicates that there is significant intra-cultural variability within each of the "island cultures".

B Sociocultural Profile of Beneficiaries

Nevertheless, at another level, there is considerable unity in the way of life on the northern atolls where pearl aquaculture development is planned. Most people of these islands are fairly traditional in their religious behavior. An important example of this is that working on Sunday is considered inappropriate and constitutes a taboo. This is true of the Cook Islands and several other island nations in the South Pacific such as Tonga, Kiribati, and Tuvalu. Subsistence fishing, horticulture, and gathering are widely practiced,

locally obtainable education is quite limited, and, in general, ideas tend to be more "traditional" than in the south. Although people living in the north do not display obvious signs of nutritional inadequacy, life is both objectively and subjectively difficult. Life for most people is difficult and they feel it is difficult. Jobs are in short supply. Money to purchase such items as petroleum products and food staples (rice, flour, biscuits, sugar, coffee, powdered milk, salt, fruits and vegetables) is often in short supply. Opportunities for agricultural development are minimal due to very limited land area and poor soil conditions, thus the development and sustainability of marine resources is of primary importance to the populations of the northern atolls. Earning enough money to get by was cited by informants as the biggest problem faced by the average Cook Islands citizen living in the north. It is these populations which would contain the largest number of beneficiaries of successful pearl aquaculture development. Because of the potential for high profit, a successful pearl farming industry could significantly benefit the men, women, and children who live on the relatively poor northern islands as well as provide significant tax revenues to the national government at a time when subsidies from the New Zealand government are being phased out.

C Local-National Lagoon-use Conflict

On the atoll island of Manihiki pearl aquaculture has already begun primarily because of the efforts of one innovator-entrepreneur who learned of the potential for pearl aquaculture from an earlier government marine resource officer and who went to Tahiti (French Polynesia) to learn how to grow pearls. The industry was already well-developed in that country. The innovator-entrepreneur had previous experience on Tahiti, for even though he was a Manihikian, he was reared for part of his childhood on Tahiti and spoke the French language. This prior experience with another sociocultural system along with his energetic temperament, probably led him to be the very hard-working fishermen-entrepreneur that he was. In many respects, he was not at all a "model personality type" in the culture and was the first Manihikian to carry out pearl aquaculture in the island's lagoon. His effort began in 1982.

Small population, localized, subsistence-based cultures are frequently characterized by an ideology of egalitarianism, and an innovative entrepreneur would be greatly at odds with this ideology. This was the case on Manihiki. Although other pearl farmers began to emerge in the local population, the Island Council (a body elected by the people of the island) moved in 1988 to stop further seeding of pearls by withholding action on licenses. This put them in direct confrontation with the pearl farmers. The Council did not act upon the applications for licenses from the pioneer innovator and several of the farmers, even though they had already begun their farming before the licensing legislation was enacted. The Council based their refusal on legislation passed by the Cook Islands Parliament in 1982 which gave the Island Councils of Penrhyn, Rakahanga, and Manihiki power to license pearl shell (for mother of pearl) and pearl aquaculture activities. Complicating the matter further, the Manihiki Island Council granted a license to a foreign (Tahitian) businessman to culture and grow an inordinately large number of pearls in Manihiki lagoon. Even under these chaotic circumstances, it is very revealing of social process on Manihiki to note that the issue was taken to the court by the pioneer innovator and there was no serious social disorder. Apparently, high stakes conflicts, as bitter as this one was, are resolved in a nonviolent manner in the Cook Islands. This would not be the case in many Pacific sociocultural systems.

The potential for future conflicts of this sort will be lessened by legislation expected to pass in Parliament by late 1989. This legislation provides for the management of the pearl industry. There is also fisheries legislation in existence which clearly spells out a grievance procedure for pearl license applicants as well as clearly establishing the ultimate power to affirm, vary, or reverse Island Councils' decisions by the national Minister of Marine Resources. The legislation also provides for the regulation of foreign investors in the industry by the Ministry of Marine Resources.

While the Island Councils have the right to grant licenses, the lagoons of the northern islands are Crown land which belongs to the central government. A license enables someone to use something without implying ownership or exclusive right. A lease, on the other hand, is a right to use an area that can be blocked out for exclusive use. The Island Councils do not have the right or power to lease areas of the lagoon. Because of their long tradition of localization, they have functioned as the de facto government of the island, and the people of the island would follow their requests. Even today,

there is the feeling among the Island Council members of Manihiki that they are the legitimate holders of power. The court and the national government of the Cook Islands have been reluctant to force the issue of ultimate authority over the lagoon and have instead mainly adopted a wait-and-see attitude toward the conflicts.

The unfortunate experience in Manihiki shows that the lucrative pearl farming industry has the potential to destabilize local as well as island-national political relationships on the localized islands of the north. Yet the experience gained from the conflicts on Manihiki has been productive in that it allows individuals and Island Councils elsewhere in the north, as well as the national government, to learn from the mistakes that led to the problems on Manihiki. Discussions with government officials in the Ministry of Marine Resources and the Crown Law Office as well as people in the private sector from Manihiki and other northern islands indicate that the Manihiki problem should resolve itself in time. The discussions also suggest, but do not guarantee, that attempts to develop pearl farming on other northern islands such as Penrhyn and Pukapuka will not result in the same problems as on Manihiki because of the lessons learned and the legislation that will be in place.

The uninhabited island of Suvarrow, is not at sociocultural risk of lagoon-use conflicts due to project inputs.

D Women in the Pearl Industry Development

There was no evidence that women's human and legal rights are violated in the Cook Islands. As already mentioned, an egalitarian ethic does prevail, and it is especially strong in the northern islands.

Although no precise data on participation by sex are available, it is clear from informant interviews that at least some women are becoming directly involved as investors in the pearl farming industry. One husband and wife couple interviewed had returned to Manihiki from Auckland, New Zealand, in order to invest in pearl farming. They had been able to save \$12,000 through employment and small-scale entrepreneurial activity in New Zealand. Reversed migration will probably increase as economic opportunities for men and women grow in the northern islands. It is clear that women in the Cook Islands are already involved in family household and business-related economic decisions. There is no reason to

doubt that this will also be the case as the pearl farming industry develops further

Lagoon fishing and collecting are often carried out by women in Polynesia, and it would be culturally appropriate for women to engage in an expanding pearl farming industry as investors and workers. There will be an opportunity for women to become highly-skilled pearl technicians who surgically implant the nucleus around which the pearl grows. This skill is not easily learned, but it would be very advantageous for the Cook Island pearl industry to train citizens of their country to do this work. This would free the industry of outside control of a vital part of the industry. Project design includes funds to begin training such technicians either in Australia and/or at the Suwarrow research facility

III ACCEPTANCE AND IMPACT OF THE INNOVATION: SMALL-SCALE OFFSHORE TUNA CAPTURE FISHERY DEVELOPMENT IN THE KINGDOM OF TONGA

A Intra-Nation Sociocultural Variability

Fieldwork in the Kingdom of Tonga revealed that there is much less sociocultural diversity among the islands in Tonga than is the case in the Cook Islands. This pattern is in part the result of the fact that the main inhabited islands of Tonga (Tongatapu, Ha'apai, and Vava'u) are much closer to each other than are the northern and southern islands of the Cook Islands. For example, in Tonga the distance from Tongatapu, where the capital of Nuku'alofa is situated, to the Vava'u group of islands is only 144 miles, and there is regular phone, airplane, and ship service connecting the island with the capital and elsewhere in the country. International airline contact through Fiji is planned for Vava'u in the near future. Among the populations that live on the islands of the Vava'u group, there is varying degrees of contact with the main town of Neiafu and with the national capital, but overall there is not the kind of northern-southern island distinction characteristic of the Cook Islands. It may also be suggested that the lack of a prolonged colonial experience in Tonga resulted in cultural change in historic times going on without the powerful differentiating influence on the nation of an overseas metropolitan culture.

B Potential for Participation

Thus fishermen and others in Vava'u, where the project will be centered, do not have a strong sense of local autonomy. They feel that they are part of the nation and have cooperated with and benefited from the Fisheries Division of the national government. Over the past 10 years, a number of fishermen from Vava'u have participated in an A I D -supported project to help facilitate greater utilization of nearshore bottomfish stocks. This project has been very successful and has brought a measure of prosperity to Vava'u fisherman and their families. This prosperity is documented by, an apparent relatively high material style of life, high percentage of home ownership and savings accounts among households in Vava'u. This relative prosperity has no doubt caused other sociocultural changes, but there is no evidence that these changes have been disruptive or unacceptable to the people of the area.

The experience of the past 10 years also indicates that many fishing families are capable of managing small businesses, including the budgeting of fishing operations and repayment of loans. It also indicates that where "pump priming" opportunities for entrepreneurial activity present themselves through government programs, they are quite willing and able to take full advantage of these opportunities. Therefore, there is no evidence that attitudes and knowledge about entrepreneurship are significant constraints on offshore fisheries development in Tonga.

While it is true that some young people in Tonga would prefer not to be fishermen or fish dealers, attitudes towards marine occupations appear to be quite positive. All informants were in agreement that fishing is not considered to be a "low" or undesirable occupation, especially if the person involved earned a handsome return for his or her efforts or owned a boat.

One possible sociocultural constraint that was mentioned and which seems to be related to inter-island localism has to do with crew composition. Several informants indicated that fishing crews work best if they are composed of individuals from the same village. While at this time it is not possible to adequately test for this pattern, it is one that should be followed in the next phase of the project, as it could significantly influence participation and performance of crews.

Another potential sociocultural constraint that may impact on project success is the taboo against working on Sunday. However, informants vary in terms of their views on how binding

this taboo actually is. Several informants indicated that some fishermen do work on Sundays, while several felt it was an inviolable pattern. One informant stated unequivocally that "only white people work on Sunday." As in the case of crew composition, it was not possible to validate the actual pattern, but experience has shown that when informants lack consensus on a cultural pattern, that pattern is likely to be weak or in a state of change. The impact of this pattern should also be taken into consideration in the next phase of the project.

C Communication

Communication with fishermen of information related to the project in the Vava'u group could pose a problem because of the scattered settlement pattern in different islands and villages in the group. Two institutions, however, tend to mitigate the communication problem. The institutions are the radio station (which is widely listened to) and the fishermen's association located in Neiafu. Both of these institutions could be utilized in efforts to disseminate project information and to facilitate meetings with fishermen in the next phase of the project.

D Beneficiaries and Impacts on Women and Families

The extended families involved in fishing in the Vava'u group will be the direct beneficiaries of project activities. Many rural fishing families in the area are also engaged in subsistence and some cash-crop activities such as growing vanilla, oranges, yams, cassava, taro, and bananas. Plantation work is conducted by both men and women, but women do not go out on deep water fishing boats. They do however engage in shellfish and other inshore marine organism collection. Many women sell horticultural and collected items in the local market. They sometimes sell fish, but this tends to be primarily male role behavior in Vava'u. If some men spend more time at sea due to the development of an offshore tuna fishery, women and their families will be required to change their customary behavior and assume more of the role behavior carried out now by men. Whether this will be perceived as unacceptable is impossible to determine in an a priori manner.

More time at sea and changes in women's role behavior will not be without compensation in terms of the benefits of increased incomes and increased local prestige. Increased

income will allow for the purchase of amenities and labor saving devices (e.g. generator, washing machine), and the maintenance of a generally higher material style of life. But the primary benefit of increased income will be that more girls and boys from rural families will be able to receive more and better education. There is state supported compulsory education in Tonga to the level of the 6th grade, but families must pay fees for education beyond that level. Furthermore the better schools are more expensive and financially hard-pressed families must often limit the education of their children. Male and female informants unanimously stated that there is no bias against females in terms of education in Tonga, and often if a family can only afford to send one child on in school, it is the oldest or brightest girl who is sent. These educational choices are in evidence in the large number of women in government service in Tonga. Boys in such families are needed to work in the family plantation or to fish. Greater incomes will allow more children of both sexes to attend school longer and will thus enhance their ability to sustain further development of the region and the nation of Tonga.

Greater incomes will also mean greater prestige in the local villages for fishing families involved in the project. In the past greater prestige has brought greater social responsibility in the church, festivals, and in relation to other members of the community. These responsibilities, if they persist, will fall mainly on women, as males will tend to be away from home more of the time.

VI. ACCEPTANCE AND IMPACT OF THE INNOVATION. SMALL-SCALE BOTTOMFISHING IN TUVALU

A Potential for Participation

Although no project design team member visited Tuvalu, it is possible to note one area of potential sociocultural impediment of the innovation. The issue of concern is whether there will be sufficient numbers of fishermen willing to spend extended periods at sea called for in the project design. This issue should be monitored in the early phases of project implementation and adjustments made in the way labor is utilized if time at sea proves to be a problem. Among many small-scale fishermen around the world, time at sea is one of the most significant negative sociocultural factors of the occupation.

V SAFETY OF THE INNOVATIONS INCREASED PERSONAL RISK
ASSOCIATED WITH BLUE WATER FISHING IN TUVALU AND THE KINGDOM
OF TONGA

A Death and Injury in Commercial Fishing

It is a well documented fact that commercial fishing is a very dangerous occupation. For example, data from the United States show that, in terms of loss of life and nonfatal accidents, it is more dangerous than mining - the most dangerous landbound occupation. Fishing puts humans into situations where they are dependent upon technology (boats, motors, pumps, etc.) that is by its very nature imperfect and subject to periodic failure. With diligent maintenance, the probability of failure at a given time can be reduced, but it can never be totally eliminated. The very fact that there must be a boat, raft or other technological intervention between humans and the aqueous medium in which they carry out their work puts them at risk. Nowhere in the world can all fishermen swim, but even those who can are in jeopardy if they lose the vessel that keeps them afloat. It is also quite clear that the dangers of fishing increase with distance from land. The farther away from land and landbound help facilities, the more risk to individuals who are in difficulty.

B Risk Related to the Tuvalu and Tonga Projects

Whenever a project requires greater numbers of fishermen to fish farther from shore we can expect that there will be an increased rate of injury and loss of life. This increased loss can never be completely eliminated, but it can be ameliorated by safety training and facilities. The projects planned for Tuvalu and Tonga will require a greater number of fishermen to extend their range of operations from inshore to nearshore (60 - 100 miles) and from nearshore to offshore (ca 200 miles) respectively. Furthermore because of constraints of capital investment, it will require fishermen in each case to fish from boats which are relatively small (30 foot and 35 foot respectively) for the distance from port at which they will operate. Experience from Tongan fishermen operating in the nearshore area over the past 10 years of an A I D -supported project shows a rate of 4 deaths in a fleet of 40 vessels. These deaths occurred when a crew of 4 was lost from one boat. Informants noted that there was no trained individual aboard the vessel at the time it sank, strongly suggesting that safety training (in addition to safety equipment) is an important element in preventing loss of life and accident.

C Fishermen's Perceptions of Risk

Research in the United States and elsewhere suggests that small-scale fisherman tend to greatly underestimate the dangers of their work and to consider safety training and carrying of safety equipment as a negative reflection on their masculinity. It has been hypothesized that this denial of danger is a way of psychologically adapting to the danger.

Interviews in the South Pacific region suggest that a similar denial of danger is prevalent among fisherfolk and government fisheries personnel alike. Informants' statements such as "the ancestors of Tuvaluans sailed all over the Pacific," "Tuvaluans grew-up sailing," or "Tuvaluan sailors are found in the merchant fleets of other nations," are used to imply the rationale that there is no need to be concerned about the ability and safety of fishermen to carry out fishing operations in more distant waters as proposed in the Tuvalu and Tonga projects. These statements are reminiscent of statements made by American small-scale fisherman such as "there is more death and injury on the highways than out on the water." Unfortunately the folk logic of these statements is false and tends to perpetuate a myth which can be very costly of life and limb.

D Impact of Injury and Death on Women and Families

It should be pointed out that when fishermen are injured or killed in their work, the resultant emotional, social, and economic burdens fall heavily on the women whose husband or son has been injured or killed. Furthermore, because those who most rely on the sea to earn their living will typically be among the poorest landless groups of their community, the burden of loss will fall disproportionately upon individuals and kinship groups which are most dependent on earnings from the sea. This process would tend to multiply the loss to women and families (Haque and Tietze, 1988).

E Implication for Project Design

The conclusion of this phase of the social soundness analysis is that adequate safety training and equipment should be a mandatory part of project implementation in the next phase of the Tuvalu and Tonga projects. The design of the pilot phase of the projects in Tuvalu and Tonga does contain provision to provide safety training for personnel involved. The design of the safety programs for the next phase of the

projects could draw on the knowledge available from Sea Grant supported research on risk taking among fishermen and the safety training programs developed in the United States for commercial fishermen, many of whom operate boats of comparable size and at comparable distances from port as is proposed in the Tuvalu and Tonga projects

Since all aspects of the Pacific Islands Marine Resources Project are intended as pilot projects, successful development of an effective safety component in the appropriate pilot sub-projects will help ensure that, as the activities spread to other peoples and nations in the South Pacific, it will be informed by the initial experience and help to minimize loss in their wider regional application. As pointed out in the Joint Fisheries Strategy Mission (n d) every year many island fishermen are lost at sea and this situation is worsening as dependence on offshore fishing proceeds. It is clear from statements in the Project Identification Document of the Pacific Islands Marine Resource Project that one of the widespread strong intentions of the Pacific Island nations is to encourage the progressive development of small-scale commercial fishing by moving beyond the reef to utilize under-exploited resources in the deep waters, preserving inshore resources for subsistence purposes. While this appears to be a sound bioeconomic aim, it cannot be done without increasing risks to individuals and their families. A cost-effective innovative safety program could be developed to accompany this project so as to mitigate the potential individual and social costs of expanded utilization of offshore banks and oceanic waters.

VI ACCEPTANCE AND IMPACT OF THE INNOVATION. RESOURCES ASSESSMENT AND ENVIRONMENTAL STUDIES AT TARAWA ATOLL LAGOON, REPUBLIC OF KIRIBATI

A Social Acceptance of Lagoon Management

The scientific information generated from this project will be used to help develop management plans for the Tarawa Atoll lagoon. Because of the localized face-to-face quality of life among the people who will be required to follow the management plan, an authoritarian top down mode of management implementation will not work. It would not be possible for police or environmental officers, who themselves are part of the localized community, to enforce the provisions of the plan unless there is supporting consensus among the people of the Tarawa Community.

Therefore, it is necessary for the government and the people of Tarawa to develop a social contract of agreement. This social contract should be based on the scientific evidence and rational management schemes derived from project inputs. An aspect of traditional Kiribati culture that favors this contract is that there has been pre-scientific indigenous marine resource conservation and management going on in various islands of the country. Gear restrictions and other native conservation techniques are based on pre-scientific beliefs and some of the techniques are of doubtful efficacy. However, the main point is that there is a traditional perceived need to conserve and manage marine resources. It is this belief that needs to be coupled with the scientific knowledge generated by the project to form the consensually derived management plan.

Because the migrant population at Tarawa does not have an integrated decision-making structure, as is found in other atolls with more stable populations, the Kiribati government must develop means to create consensus on the new scientifically based management regimes. Possibly this can be accomplished by community outreach programs such as short-term public education, posters, radio announcements, and public meetings between government officials and the local public.

B Awareness of Potential Short-term and Long-term Social Impact of Alternative Management Strategies

It is important that project personnel and government officials be aware of the trade-offs between short-term hardships and long-term benefits of various management strategies.

Strategies involving such restrictions as use of motorized fishing boats in the lagoon, collection of juvenile shellfish, and imposing closed seasons for specific fishing grounds all involve some short-term loss of cash and/or non-cash income in favor of helping to insure long-term sustainability of subsistence and commercial fisheries.

The short-term social and economic costs of imposing various management schemes must be assessed and minimized, as alternative strategies are considered, so that long-term objectives of consensual conservation and management of natural resources will have a maximal likelihood of being successful.

VII. ACCEPTANCE AND IMPACT OF THE INNOVATION SMALL-SCALE COMMERCIAL FISHERIES DEVELOPMENT IN PAPUA NEW GUINEA

A Origins of Intra-nation Sociocultural Variability

In terms of the number of distinct local sociocultural groups and in terms of the sense and strength of sociocultural localism, Papua New Guinea is one of the most distinctive nations in the world. This pattern is evidenced by the existence of over 700 distinct sociolinguistic groups in the country of some 3 million people. These distinct groups evolved in Papua New Guinea over the 20,000 or more years of human occupancy of the area. Probably because of a dense population made possible by a very productive horticultural system, warfare came to be the main mode of boundary maintenance between groups in pre-European times. This pattern of dense population and boundary maintenance was most typical of the interior highlands, but warfare seems to have been present in the less densely populated coastal areas as well.

1) Origins of Sex-linked Inequality In cultures characterized by chronic warfare, which is carried out primarily by males, women's positions tend to be compromised. The legacy of inequality of the sexes is slowly changing in traditional Papua New Guinea. In the modern sector, women's status has greatly improved. Nearly equal numbers of women and men voted in the last national election. Women hold government positions and are very active in the private sector as well. They play a particularly important role in small-scale commercial fisheries as marketers of fish.

B Traditional and Colonial Fishery Development in Papua New Guinea

Coastal main island areas of Papua New Guinea have never been as densely populated as the highlands. Even today only 13 per cent of the total population lives in the rural coastal areas, while 68 per cent lives in the highlands. The remaining 19 per cent live in the main towns which became prominent only after Europeans arrived on the scene.

The coastal islands of the country are relatively more densely populated because of their limited land areas per inhabitant and not because they contain large populations.

It has been suggested that the coastal population pattern of the main island is related to a greater presence of disease.

vectors and vulnerability to attack in this area. The settlement pattern is probably responsible for the fact that marine fishing did not evolve as an important traditional mode of production except on the islands off the main island of Papua New Guinea. Even though the waters around the country are rich in marine resources, there is not a strong traditional fishery.

The arrival of Europeans in the 19th century did not result in a strong emphasis on fishing in the colonial economy. Colonial economies tended to be designed to provide tropical agricultural and other products that were in demand in Europe. Little attention was paid to developing fishing probably because Europe was well supplied with fish from nearby North Atlantic fisheries. For these reasons we find that contrary to the widespread world pattern of over-fishing, the fisheries of Papua New Guinea are underutilized and offer an excellent opportunity for sustainable development.

C Intracultural Variability in the Project Sites and Project Design

Delocalization and modernization have occurred and continue to occur all over Papua New Guinea. This is due to such pressures as electronic media and the high wages obtained in the copper and gold mining industries in the country. Missionary activity, new roads, airfields, tourist facilities, motor vehicles, and greater cash dealings are all evidence and part of the process of delocalization. Nevertheless along with the indicators of delocalization, we observe that varying mixes of traditional subsistence hunting, animal husbandry, horticulture, social organization, ideology, and languages are still widespread. Furthermore, these mixes vary considerably across relatively small geographical distances in the country.

In designing the directed change effort in fisheries, the precise mixes of intercultural variability will be assessed during the planning phase of the project. The information derived from this assessment will be used to make decisions regarding how the proposed change can be made appropriate and in keeping with the various mixes of sociocultural systems within the three target areas.

D Resource Rights, Marine Tenure and Project Design

The modern-traditional sociocultural dualism of Papua New Guinea is manifested in the domain of tenure and resource

rights to the land and marine areas of the country. Ownership of land and rights to natural resources primarily follow customary law in Papua New Guinea. Land and marine rights are a permanent and integral part of a community and cannot be bought or sold as commodities as is the case in European legal systems. Only 2 per cent of the nation's land falls outside the customary legal system.

This traditional system makes it extremely difficult for businesses to gain access to land and resources, particularly outside the urban-town areas. Project design is set up to accommodate to this reality by directing development efforts toward communities that elect to become involved in the project. Local customary decision making will be determined in the sociocultural analysis and respected in terms of which communities will be involved, who will participate and how the ensuing benefits are allocated. Prior knowledge of the general sociocultural patterns, decision making, the details of customary law, and marine holding patterns will be determined during the planning phase of the project.

E Traditional Values, Potential for Participation and the Spread Effect

Entrepreneurial values related to competitive individual striving and acquisitiveness do not exist among many people in Papua New Guinea. Perceived needs are low by metropolitan area standards and can be readily satisfied in the context of the highly productive traditional village subsistence economy. Since responsibility for production tends to be diffused throughout the community, there is little pressure on the individual to strive toward achievement in the western sense of the concept.

Many individuals choose to experiment with or adopt a westernized way of living. However, returning to the village subsistence economy is always an option if the new way of life is less rewarding. Given the frustrations inherent in moving toward a modern life, it is not surprising that there is instability of participation in the cash economy labor force.

Project design takes this sociocultural reality into account by linking the project to urban and peri-urban market areas where greater individual and community level modernity is likely to be found. Of the three project areas (Madang, Lae, and Rabaul), Lae is the most "modern", while the Madang area appears to be the least.

It will be important to assess the potential spread effect of this pilot project to other parts of Papua New Guinea. This will be possible by relating individual and community level sociocultural factors to individual and community level participation and successful involvement in the project. Further efforts in small-scale fisheries development can then be directed towards populations that have the highest predictable potential for success.

There are examples of successful entrepreneurial small-scale fishing going on in the communities of the Central Province. The people in these communities market their fish in Port Moresby and appear to be very prosperous even by metropolitan standards. Individual earnings of \$120-240 kina per day are fairly common. It is possible to conclude from these cases that entrepreneurial small-scale fishing is possible in Papua New Guinea under the right sociocultural and economic circumstances. The aim of the planning and later phases of the sociocultural analysis is to help determine what these circumstances are.

F Beneficiaries and Women in Fisheries Development

The direct beneficiaries of project activities will be the families who turn their efforts toward more effective small-scale fishing as provided by project inputs. Higher incomes will accrue to these families. It is expected that women will participate in decision making regarding small-scale family businesses, as they are expected to play a key role in marketing of fish as they do in Central Province around Port Moresby.

Children would also benefit from greater family income, as this would help to ensure that fewer children will be denied educational opportunities due to family financial restrictions. Education in Papua New Guinea is not free and becomes more expensive the higher one goes in the system. As Papua New Guinea continues to modernize, education of children will become more and more important in sustaining the process and for individuals to derive maximum benefit from and adjustment to the process.

Because of the disadvantaged position of women in traditional Papua New Guinea culture, the project is designed to devote special attentions in cooperation with national and provincial governments to Women in Fisheries Development information gathering and dissemination. This will involve gathering information on women's position in the local

sociocultural systems Analysis of information gathered and community level workshops and other vehicles of transfer will be carried out The Fisheries Department of Papua New Guinea has plans underway to appoint the first director of a Women in Fisheries Development Office, and it is expected that project personnel would work closely with this office and provincial officials on Women in Fisheries Development issues

VIII PRECAUTIONARY NOTES BASED ON PROJECT DESIGN FIELDWORK IN THE SOUTH PACIFIC

All project personnel should be aware of three problems in conducting work in the South Pacific region These are as follows

1) Isolation Several project sites will involve considerable isolation from cosmopolitan centers Isolation has been linked with psychological stress and in some cases with panic Personnel who expect to be in such situations should prepare themselves to cope with the stress involved Contractors should provide for stress management instruction as part of team preparation

2) Communication Although English is widely used in the South Pacific, many people in the region are monolingual native language speakers Also proficiency with and the semantics of English among local speakers of the language varies considerably from area to area Considerable non-sharing of meaning was observed during preliminary fieldwork All personnel should be aware of the probability of non-sharing of meaning in communicating with people in the area and should take steps to ensure that understanding exists

3) Personal Safety A fair amount of petty crime and serious violence exists in both the rural and urban areas of Papua New Guinea The police in Papua New Guinea have been ineffective in dealing with this crime Project personnel should consult with the United States Embassy in Port Moresby for up-to-date information and advice on coping with crime

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ANNEX J

ENVIRONMENTAL ASSESSMENT

Project Location	South Pacific
Project Title	Pacific Island Marine Resources
Life of Project	FY1989 - FY1994
Funding	\$12.5 million
IEE Prepared By	L. G. Clark Fisheries Advisor
Environment Action Recommended	Negative determination

Mission Environmental Officer	Signature <i>Eric N. W. H.</i>
	Date 16 August 1989

Regional Director's Concurrence	Signature <i>Bob Belwood</i>
	Date 9/16/89

Decision of Environmental Officer Bureau for Asia, Near East.	Approved
	Disapproved
	Date

The environmental impact of this project is positive for all components. Natural marine resources are more rationally managed through appropriate conservation measures. In most cases, management and conservation plans are either in place, planned or an integral part of the project. A negative determination was made at the PID stage (see response cable State 150042) for the Regional Component, Tonga and Kiribati, with deferral on the other three elements. Environmental assessments are therefore included for the Cook Islands, Tuvalu, and Papua New Guinea, as follows:

COOK ISLANDS

I BACKGROUND

Basic conditions prevalent in and for the Cook Islands are stated in the Country Component Annex. There is a significant geological and cultural difference between the southern high islands of the Cooks, and the northern atolls. This project pertains only to the latter, except for governmental controls and regulations emanating from the seat of government in Rarotonga. The northern atolls are reasonably to nearly fully pristine, thus of initial environmental concern. The project has a biologically positive potential for pearl oysters, as the natural populations are over-harvested and needing proper management. The major concern is therefore the potential for introduction of disease to either the cultured or the natural population of pearl oyster. The second concern is for the essentially uninhabited atoll of Suvarrow, a national sanctuary, which will be the site of the project's pearl farm and research station. These and other relevant elements are discussed below.

ISSUES

A Disease - Spread of disease is always a concern in animal husbandry, including that for cultured aquatic animals. It has been less addressed in mariculture, as the science is less developed. Nevertheless, disease has been reported in cases of intensive culture, and is of major concern recently in highly intensive culture of marine animals, like the marine shrimp (e.g. Penaeus monodon in the Philippines and Taiwan). For the pearl oyster in question (P. margaritifera), disease has been responsible for significant oyster mortality in French Polynesia, the only other location for major culture activity of pearls with this species. Similar problems have been solved in related species in Australia through improved oyster husbandry.

The cause of oyster disease is not known, but assumed to be bacterial, and assumed to be Vibrio related. It may be that vibrio infections are a symptom, rather than cause, as related to intensive culture and cleaning practices. Proper regulation and management will result in significantly lowering the probability of disease.

This will be addressed through a ban on importation of oysters, spat, or equipment from other island groups (e.g. neighboring French Polynesia), and will be addressed in the national pearl management plan to be adopted by GOCI prior to project implementation. Secondly, proper husbandry will be taught at the Suvarrow facility which will negate the potential of overcrowding and oyster cleaning-related pollution, which are presumed to be the inducement of previous pearl oyster disease. Without such training and management, as addressed through this project, practices causing and resulting in the spread of disease are likely.

B Suvarrow Atoll - Suvarrow atoll is a designated Cook Islands national park. The park is managed by the Conservation Service, which locates one Conservation Officer on the atoll. Due to interpretation of wording in the Act establishing the park, the Conservation Service has responsibility only for the islands (motus) of the atoll, not the subtidal environment. The atoll is therefore basically a seabird reserve with no fisheries control or regulations. The atoll is visited by approximately 50 yachts per year as well as infrequently by residents of other atolls. Pertinent issues include 1) continued protection of seabirds, 2) potential for rat introduction and spreading, 3) marine environment protection, and, 4) facility siting.

Several of the motus are nesting sites for thousands of seabirds of roughly a dozen species. The motu, Anchorage Island, which is proposed as the site for the pearl farm facility, is not one of significance for seabirds. Infestations of the polynesian rat have reduced this possibility. Eggs and young are taken by other atoll residents and passing yachts, but the effect is not considered significant. None of the birds resident on Suvarrow are endangered or threatened, but the existence of the rookery is of significance for the seabird populations of the region. The introduction of up to 20 individuals living on Anchorage Island is not considered an increased threat to the seabird populations of Suvarrow. A comparison is the United States Naval facility on Wake Island, which coexists with significant seabird populations. Location of the pearl facility has a positive impact, as conservation training will result, and significantly increased living standard will result for the conservation officer now stationed there as the MMR and project will provide permanent housing for all residents.

The Conservation Service is primarily concerned about the possible introduction of the Norway rat (Rattus rattus), which could seriously affect the seabird population. The polynesian rat already in large numbers on Anchorage Island has not spread to the other motus, and is not as serious a threat. Measures to insure non-introduction of the Norway rat will be incorporated into the management of the facility. Meanwhile, measures to significantly reduce the polynesian rat will result from human habitation.

The major marine animals of concern are sea turtles and the natural pearl oysters. It is unlikely that other marine animals, like corals, will be affected, unless an airfield is added at a later time (present plans exclude an airstrip). The turtle in question is the green (not endangered) and nests are not likely to receive greater impact. Training through contact with the conservation officer and others should result in better understanding of conservation needs and practices, therefore resulting in a positive effect. Proper oyster husbandry techniques, as taught at the pearl research facility, will reduce the possibility of disease spreading in other locations when the trainees return home. It is unlikely that disease will be spread to natural oyster populations from this facility, as siting of farm and cleaning stations will take natural oyster populations into account. Potential for enhancement of presently over-harvested natural oyster populations is also significant, and a major potential positive effect.

Siting of the research facility includes both buildings and underwater locations. The proposed site is not considered a significant change to the environment, as previous construction already exists. Alternate sitings are not to be considered, especially motu tou, which is a major bird rookery. Considerations for placement of the buildings include potential for a future airstrip, and location of storage and outlets (e.g. sewage outfall, etc). Handling of sewage and garbage, as well as proper storage of fuel are recognized issues. Such considerations will be incorporated into the facility design, and the Conservation Service will be consulted by the Ministry of Works in the design and construction. Location of spat collectors, buoy and raft locations for the oysters, and oyster cleaning sites will also be incorporated into the facility design. The facility should therefore not adversely affect the environment.

C Support Vessel - Environmental effect of the support vessel is not significant, and no greater than for the vessels that already stop at Suvarrow. A small fuel spill could result from wreckage of the vessel at Suvarrow, but that event is highly unlikely.

D Other Islands in the Cooks - The effect of human transport will be no more significant than that which already occurs. The effect of oyster transfer (spat or adults) will be insignificant, with the proper handling and recognition of disease transfer potential that will be incorporated into management of the Suvarrow facility and the Cook Islands Pearl Management Plan.

E Extension to Other Nations - As this is a pilot project, it is anticipated that pearl farming will be eventually encouraged and introduced into other island nations. Utilization only of local oyster populations will be encouraged, especially if under auspices of A I D. Nations wishing to become involved in such projects will agree to importation restrictions. Hence, disease spread should be controlled. Without recognition of possible effects, such as those promoted through this project, introduction of oyster disease is a real possibility. This is largely due to the limited distribution of proper subpopulations of P. margaritifera for culture of pearls with proper color. In the long term, it is likely that pearl oyster hatcheries will develop, as well as disease recognition, but it is unlikely that transfer of oysters from nation to nation will be allowed.

CONCLUSIONS AND RECOMMENDATION

Management plans for the pearl industry in the Cook Islands and for conservation at Suvarrow atoll will be developed. Environmental concerns, as raised above, will be incorporated into the management plans. Consultation of MMR and Ministry of Works with conservation personnel will continue under the project.

In view of the above, a negative determination for the Cook Islands component of this project is recommended.

TUVALU

The environmental effect of this project on the marine resources of Tuvalu is positive. The project will encourage development of the offshore fisheries resource incorporating national management and resource monitoring. It is likely that the offshore bottom resources will be harvested without this project, but without proper attention to conservation of the targeted or otherwise affected natural resources. Resource assessment incorporated into management planning will result in natural resource conservation.

Ship construction will be limited, as the resource will not support large or numerous vessels. Raw materials will have to be imported for such construction, and therefore will not affect these resources in Tuvalu.

Extensive harbor alteration or construction is not proposed.

CONCLUSION AND RECOMMENDATION

A negative determination is recommended for the Tuvalu component of the project.

PAPUA NEW GUINEA

It is recognized that intensive fishing pressure and destructive fishing practices can alter the structure of multi-species fish assemblages, especially in the tropics, by reducing diversity and altering inter-specific interactions. However, if fishing intensity is regulated within defined limits of fishing effort, and nondestructive fishing practices are carried out, the exploited species composition will remain appropriately diverse. The PNG element of this project is designed to carefully monitor and assess the biological and environmental consequences of exploitation of reef, reef slope, and coastal pelagic fish assemblages. A small reduction of species diversity may occur in more exploited areas. However, this effect will be local, and no environmental damage or permanent diversity changes are anticipated.

As this project is primarily technical assistance and training, there are no land-based activities that require construction or infrastructure development. Consequently, there will be no adverse environmental impact to near shore of coastal areas.

CONCLUSION AND RECOMMENDATION

A negative determination is recommended for the Papua New Guinea component of the project.

ANNEX K

INSTITUTIONAL AND MANAGEMENT ANALYSIS

This analysis describes the institutions involved in project implementation, and the overall management plan, for project operations. The project's institutional approach uses existing institutions in each country where possible. It is primarily a private sector income-generating activity and as such is being implemented by private groups in each country. Government's role in the project is limited to natural resource management assessment and planning.

National Institutions

In addition to the private sector personnel, firms, and organizations being used in Cook Islands, Tonga and Tuvalu, the University of the South Pacific will assist in implementing the research and strategy development activities in Kiribati. In all these cases, project activities will be undertaken in tandem with U S private firms and/or PVOs. The activity in Kiribati calls for a U S university to work with the existing USP Atoll Research Development Unit (ARDU).

In the Cook Islands, the research facility at Suvarrow will be operated by the GOCI Ministry of Marine Resources with the cooperation of the National Conservation Authority (a private organization entrusted by government to oversee national parks and conserve wildlife resources). Since Suvarrow is a national park, private firms cannot set up facilities there.

Stock assessment work to develop MSY figures for specific fisheries Tonga and Tuvalu will be completed with government marine resource personnel and project supplied experts. A private U S firm and/or PVO will be solicited to operate the Cook Islands, Tonga and Tuvalu components as a single project management unit.

In Kiribati an existing institution, the ARDU, will be used to implement the research program. As an institute of USP, this unit has the potential to develop into an applied atoll research center for the region. The current institutional opportunities which can justify investment in ARDU are

- An I-Kiribati Director employed by USP is available full-time under existing regional funding to assist the Marine Resources Advisor to manage the activities there. He has been using very limited funding in a

careful way and is therefore in a position to use some of these funds to support local technical personnel for the project, and recruiting of local hired project staff

- The Ministry of Natural Resources Development (MNRD) and ARDU have clearly delineated roles and responsibilities. MNRD is responsible for fisheries development activities and ARDU is responsible for applied research in both agriculture and marine resources

Constraints to the full development of the ARDU include 1) a weak funding base with only a small amount of resources for operational research from USP, 2) lack of current donor funding to supplement this base, 3) limited government "ownership" of the unit due to USP affiliation and lack of resources to respond to GOK proposed research topics, 4) weak linkages between applied research and government decisions. The project will include a covenant to increase GOK participation in ARDU advisory committee research priority setting

The institutional development planned for the ARDU is modest and focused on tangible gains in limited high-priority applied research areas. Improvements in linkages with government decisions will determine whether the ARDU can fulfill its national as well as regional objective under the project

In Papua New Guinea, the project will collaborate with local authorities in the market centers where the fisheries activity will be undertaken. The primary project implementors will be a U S PVO, university or private firm or combination of these. They will work directly with the village and town private sector fishing and marketing activities. No government organizations will be directly involved in implementation but will be supplied project survey and planning results and will participate in activity selection. Government is particularly interested in monitoring the results of the community survey and the role of women in fisheries (see annex I, Social Soundness)

Regional Institutions

As noted in the regional impact component described in Annex F, the project will use several existing regional institutions for project results dissemination and information

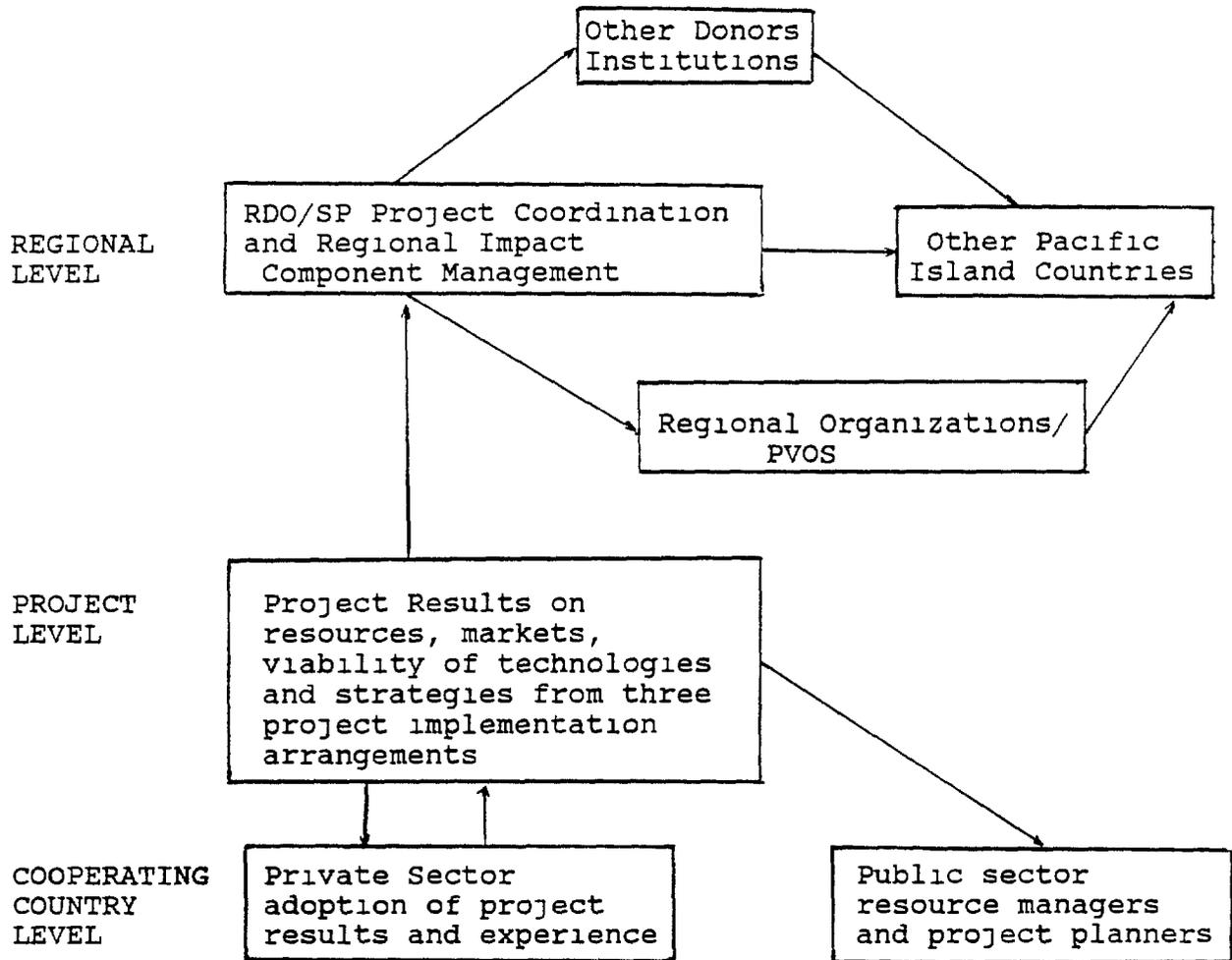
sharing The SPC will be used to disseminate technical and scientific information and the FFA focus on economic and policy information generated by the project Regularly scheduled meetings and workshops planned by these organizations will be used to disseminate project results The project will fund a small number of workshops and meetings to supplement regional organization meetings as needed The regional PIMRIS information system will receive project-generated documents for dissemination throughout the region These reports will provide results of stock assessments in all five countries for key fisheries and data on MSYs for these fisheries as they are determined In addition, the project will generate data on technologies and methods for longline fishing and pearl culture which will also be available for dissemination to island countries through regional institutions (See Figure K-1 for outline of project MIS and interrelationships of information available for decisions on fisheries development through the project)

Management Considerations

The project will be managed by RDO/SP's Agricultural Development Officer with two personal services contractors One contractor will act as the Fisheries Advisor and manage all aspects of project implementation The other PSC contractor will be responsible for regional impact activities and coordination with the regional institutions (USP, FFA and SPC) which will be actively involved in disseminating project results to member countries and donors The ADO will be expected to spend 10% of his time monitoring this project, the two PSC's are full-time positions

The project itself will have three management units reporting to the RDO/SP project management These three units will cover the five country components The regional impact component will be managed by the RDO/SP based project coordinator and regional impact component coordinator directly The three management units of the project will be selected by competitive bid An overall consortium approach to managing all the activities was considered by the design team in the interest of reducing contracting and monitoring for RDO/SP. While appealing from an initial start-up phase viewpoint, the longer term cumbersome nature of such an arrangement bid to its rejection The selected range of activities and institutions allows for both flexibility in contracting arrangements and for a better match of expertise to need (See Figure K-2)

FIGURE K-1
 PACIFIC ISLANDS MARINE RESOURCES PROJECT
 MANAGEMENT INFORMATION SYSTEM

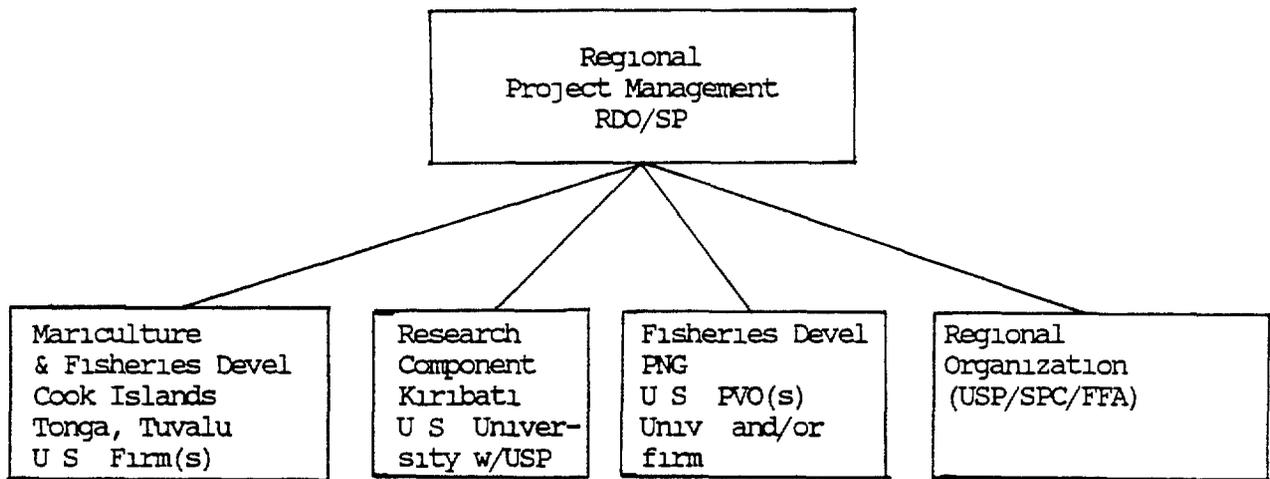


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FIGURE K-2

PACIFIC ISLANDS MARINE RESOURCES PROJECT

MANAGEMENT CHART



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For Papua New Guinea, a U S PVO, university, private firm or combinations of these will compete to provide technical assistance services for sector and community analysis, planning and limited technology testing This organization or set of organizations will report to the A I D Assistant Director in Port Moresby on all policy and administrative issues and to RDO/SP in Suva for technical oversight and project monitoring A cooperative agreement mechanism will be used

For Kiribati, a U S university will compete for the technical assistance and research activities A cooperative agreement will be negotiated after a competitive selection process The university will report to RDO/SP in Suva and will maintain liaison with USP as the managers of the ARDU on any necessary organizational questions/issues

For Cook Islands, Tonga, and Tuvalu, a contract will be negotiated with a U S firm, or PVO or combination of these after a competitive bidding process This project unit will be based in Tonga and the project manager will visit Cook Islands and Tuvalu on a regular basis to provide management supervision to the fisheries development personnel implementing those components The exact allocation of time among the three sites will be determined during project start-up Initially more time may be needed in Tonga and Cook Islands since those components will be ready to start quickly The contractor will report to RDO/SP on progress in all three components If a joint venture arrangement is selected, the prime contractor will be responsible for reporting to RDO/SP for all its partner organizations

Training will be managed by the RDO/SP Training Advisor for long-term degree training and selected short-term training The training advisor will work with ADO to develop PIO/P's and ensure that project objectives are being met

ANNEX L

DESIGN TEAM MEMBERS

ANNEX L

PROJECT DESIGN TEAM

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