


**BASIC DESIGN SURVEY REPORT**  
**FOR**  
**FISHERIES DEVELOPMENT PROJECT**  
**IN THE REPUBLIC OF ECUADOR**

OCTOBER 1980

**JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)**

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**BASIC DESIGN SURVEY REPORT**  
**FOR**  
**FISHERIES DEVELOPMENT PROJECT**  
**IN THE REPUBLIC OF ECUADOR**

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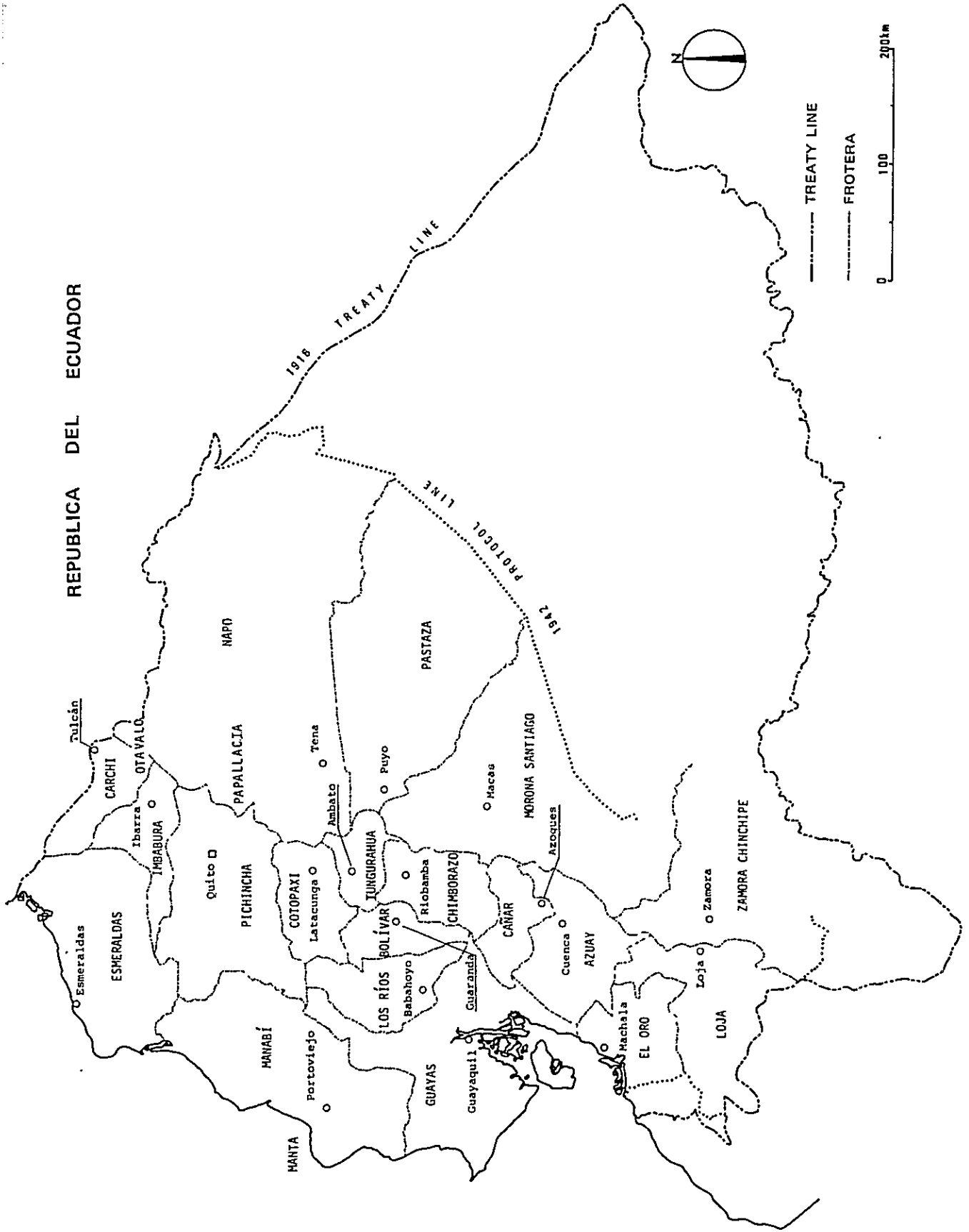
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Signing Ceremony of the Minutes



# REPUBLICA DEL ECUADOR







## PREFACE

It is with a great pleasure that I present this REPORT ON BASIC DESIGN SURVEY FOR THE FISHERIES DEVELOPMENT PROJECT IN THE REPUBLIC OF ECUADOR to the Government of Ecuador.

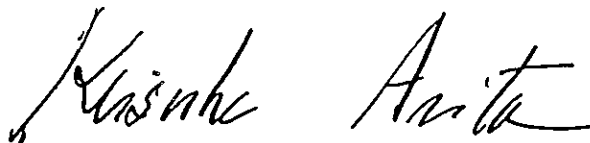
This report embodies the result of a basic design survey which was carried out in the Republic of Ecuador from July 31 to August 20, 1980 by the Japanese survey team commissioned by the Japan International Cooperation Agency following the request of the Government of the Republic of Ecuador to the Government of Japan.

The survey team, headed by Mr. Satoru Koakutsu, had a series of discussions with the officials concerned an extensive field survey and data analysis.

I hope that this report will be useful as a basic reference for development of the project.

I wish to express my deep appreciation to the officials concerned of the Government of the Republic of Ecuador for their close cooperation extended to the Japanese team.

October, 1980

A handwritten signature in black ink, appearing to read 'Keisuke Arita', written in a cursive style.

Keisuke Arita

President

Japan International Cooperation Agency



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## RESUMEN

### Detalles:

El gobierno de la República del Ecuador planteó el plan Nacional de Desarrollo de 5 Años (1980~1984), y para corresponder a este Proyecto, hizo un plan de explotación de los productos marítimos en virtud del mejoramiento del alimento nacional y la fomentación y consecución del progreso apropiado en la industria pesquera y del desarrollo de las zonas correspondientes.

Para cooperar en dicho plan de explotación del gobierno ecuatoriano, el gobierno japonés epidió una delegación investigadora para el diseño básico sobre los equipos y materiales respecto de los estudios científicos y educación de los productos marítimos e igualmente sobre los equipos, materiales y facilidades requeridos para estimular la piscicultura de agua dulce, los cuales han de ser ofrecidos gratis. La delegación investigadora, permaneciendo en la República ecuatoriana del 31 de julio al 20 de agosto de 1980, visitó e hizo investigación del estado actual en el Instituto Nacional de Pesca, la Escuela de Pesca de Manta, las piscifactorías en Chilimachay, Cotopaxi y en Punyaro, y los solares destinados a la construcción de las piscifactorías en Mojanda y Papallacta. En esta investigación, le acompañaron a la delegación unos oficiales en cargo asignados de la organizaciones relacionadas del gobierno ecuatoriano,

quienes hicieron explicaciones en detalle en cada sitio y con quienes efectuó la delegación la deliberación. Luego, basado en la consecuencia resultada de las observaciones de la investigación, la delegación deliberó detenidamente sobre los materiales y equipos necesarios que han de ser ofrecidos con los oficiales de las organizaciones interesadas del gobierno ecuatoriano tales como el Ministerio de Asuntos Exteriores, el Ministerio de Recursos Naturales y Energeticos, el CONADE, Subsecretario de Recursos Pesqueros, la Dirección General de Pesca, el Instituto Nacional de Pesca, la Escuela de Pesca de Manta, la Empresa Nacional de Pesquería, etc. En consecuencia de estas deliberaciones y discusiones amigables, se comprobó que las dos partes se entendieron mutuamente y llegaron a un acuerdo como se muestra en la lista adjunta y se hicieron las minutas, las cuales se firmaron por Ing. Com. Tuly Loor Argote, Subsecretaria de Recursos Pesqueros que delegó la parte del gobierno ecuatoriano y por el Sr. Koakutsu, Jefe de la delegación japonesa, y se intercambiaron los opiniones.

Contenidos de los materiales y equipos ofrecidos:

Los equipos y materiales que se requieren para la educación y los estudios de productos marítimos y para la fomentación de la pesquería de agua dulce en la República ecuatoriana se compendian como lo siguiente:

(Para más detalles, véase la lista adjunta)

1. Equipos y materiales respecto al Instituto Nacional de Pesca 43 ítems
2. Estacion Piscícola para Collejon Interandino (bajo la jurisdicción de dicho Instituto Nacional) 19 ítems
3. Respecto a las piscifactorías bajo la jurisdicción de la Oficina General de Pesquería 33 ítems
4. Respecto a la Escuela de Pesca de Manta:
  - Unidades móviles de entrenamiento 3
  - Facilidades de la escuela 22 ítems

Eficiencias previstas de la oferta de los equipos y materiales:

1. Se espera que los equipos y materiales ofrecidos al Instituto Nacional de Pesca harán una contribución a los estudios y las investigaciones de los recursos pesqueros y a la expansión y el mantenimiento de los mismos al mismo tiempo que darán un efecto muy útil para el desenvolvimiento apropiado de la industria pesquera en el Ecuador.
2. Los equipos y materiales ofrecidos a la Escuela de Pesca de Manta serán muy efectivos para la educación y el adiestramiento de los pescadores en familia de

pequeña escala y para la formación y el entrenamiento de los especialistas de los productos marítimos; lo que se hará como la base hacia el desarrollo de la industria pesquera capitalizada, y su efecto será muy grande.

3. Los equipos y materiales ofrecidos a las piscifactorias son los fundamentales requeridos para la promoción de los proyectos de piscicultura, si una vez se dispongan debidamente la colocación de los personales y la administración operativa por la parte del gobierno ecuatoriano, aquéllos funcionarán más efectivamente y se convertirán en un promotor que hace desarrollar rápidamente la industria de piscicultura en el país.

Observaciones que deben notarse sobre los equipos y materiales ofrecidos:

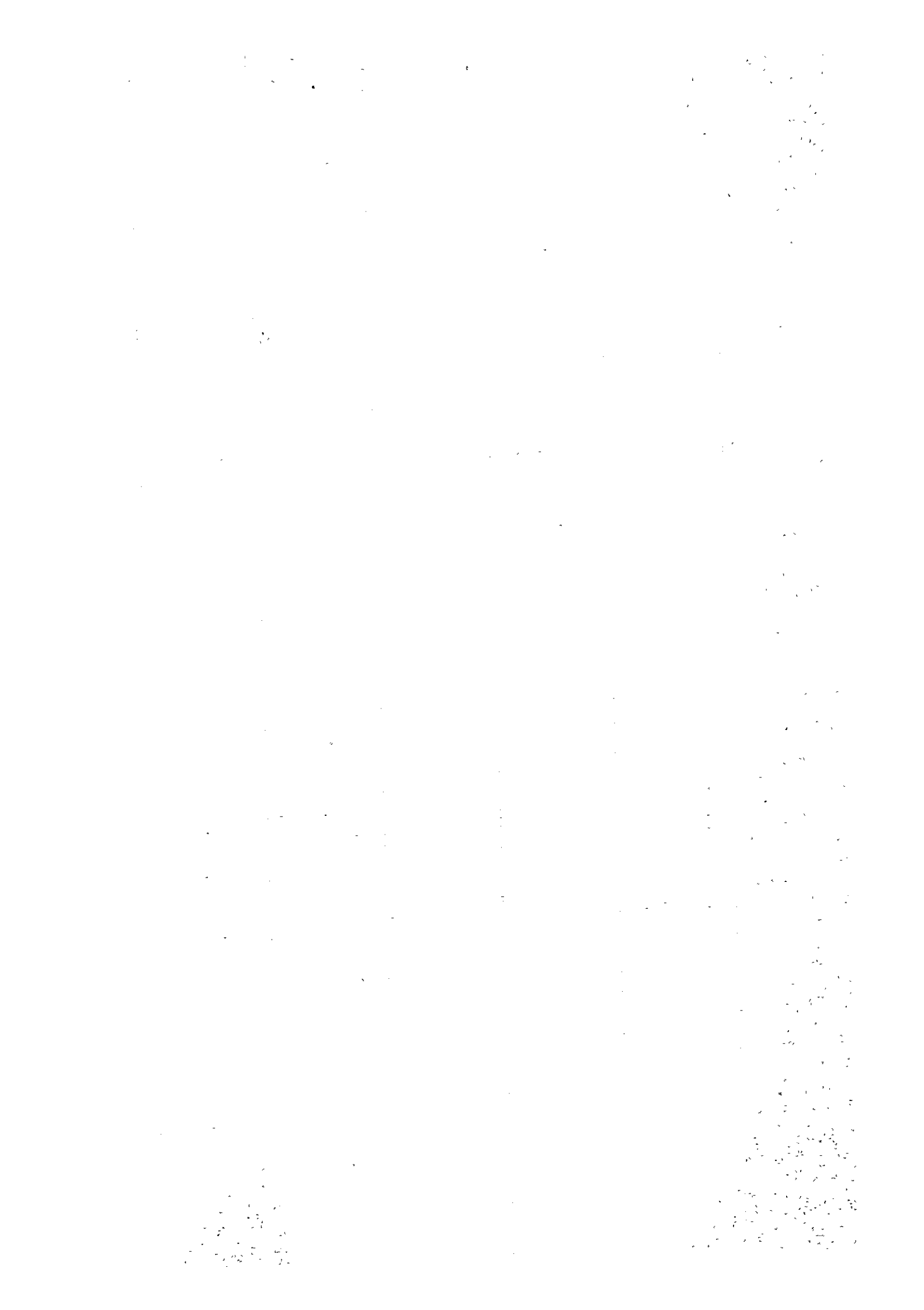
1. Es indispensable para la utilización efectiva de los equipos y materiales ofrecidos conseguir y colocar el personal adiestrado a manejarlos y administrarlos apropiadamente.
2. Deben preocuparse debidamente los lugares donde se ponen los equipos ofrecidos y la fuerza eléctrica, etc.



3. Deben efectuarse periódicamente las inspecciones para el mantenimiento de los equipos y materiales ofrecidos para utilizarlos más efectivamente.
4. Los equipos y materiales ofrecidos han de ser entregados a puerto ecuatoriano; por lo que deben transportarse con mucho cuidado y precaución hasta los lugares donde se hallan las organizaciones en que se instalen.



## Chapter 1. Background and Objective of the Survey



## Chapter 1. Background and Objective of the Survey

### 1-1 Background

The Republic of Ecuador has had a new regime based upon constitutional democracy since 1978, and the incumbent president, Mr. JAIME ROLDÓS, has a tenure of office of 5 years. The present government has formulated the Five Year National Development Plan (1980 ~ 84) for development of the industry and economy of the country and for stabilization of the people's livelihood through increased employment opportunities.

A fisheries development program has been formulated as an integral part of the Five Year National Development Plan.

With due participation of the National Development Committee, responsibility for executing the program has been assumed by the Ministry of Natural Resources and Energy. Accordingly, in the Ministry of Natural Resources and Energy a vice secretary is charged with the responsibility for the fisheries development program.

In connection with the fisheries development program, the government of the Republic of Ecuador requested the government of Japan through the Japanese Embassy in Ecuador for a grant to supply equipment to inland water fish culture and fisheries training project.

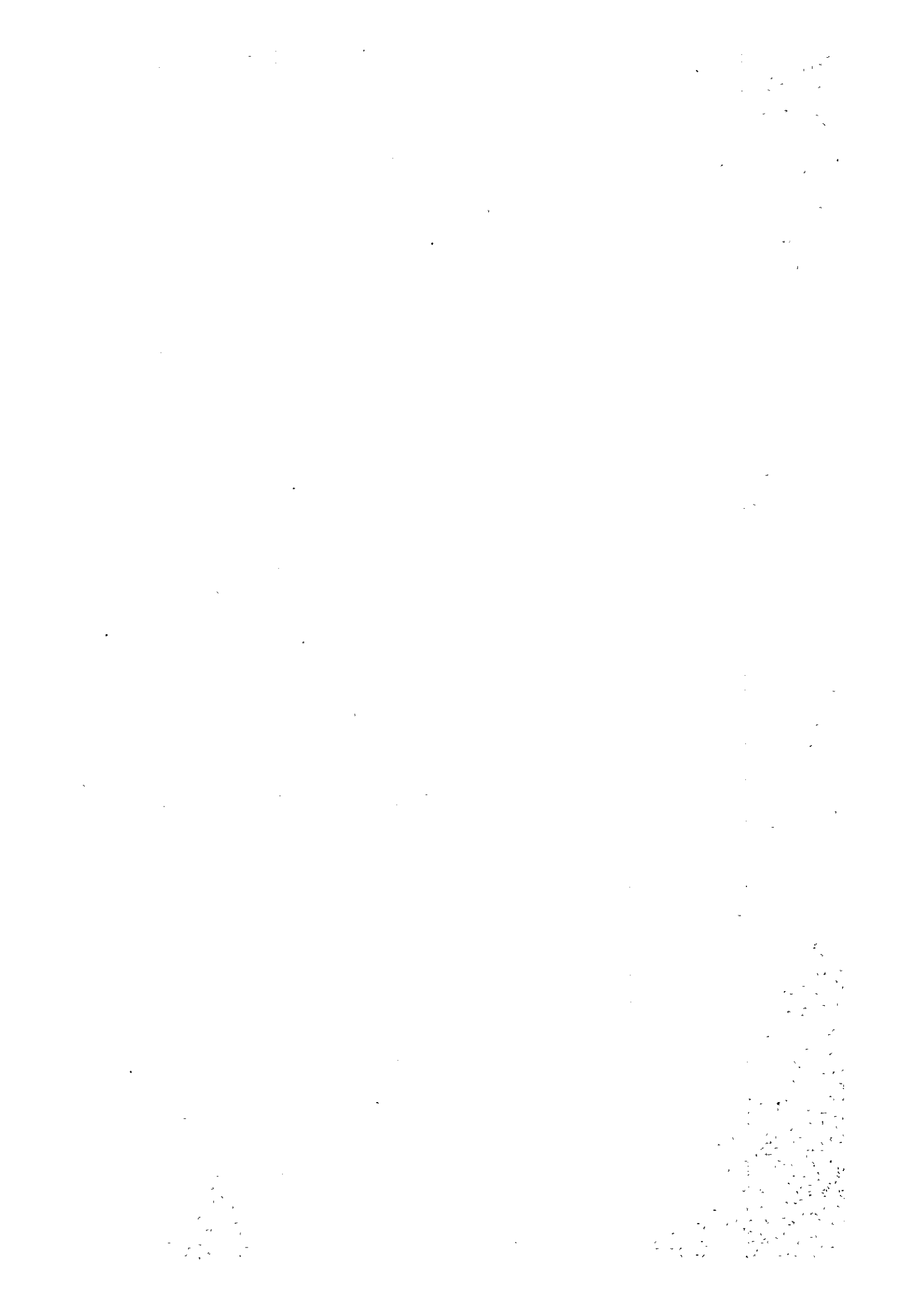
The request from the Republic of Ecuador was intended to accelerate the execution of the fisheries development program by the grant from the Government of Japan which would be used to improve and expand the facilities for research and education on fisheries and fish farming.

The Government of Japan, having given due consideration to the request, sent a mission of Japan International Cooperation Agency, which conducted a survey on the Possible assistance to Ecuador for 21 days from July 31 to August 20, 1980.

#### 1-2 Purpose

The purpose of the mission was to study the fisheries development Program of the Republic of Ecuador and, more specifically, to review the background and particulars of the inland water fish culture and fisheries education projects, and to discuss with the personnel of the Republic of Ecuador preparation of a list of equipment to be proposed for grant.

## Chapter 2      Organization and Activities of the Mission





## Chapter 2. Organization and Activities of the Mission

### 2-1 Organization of the Mission

Name	Assigned Duties	Positions
Satoru KOAKUTSU	Leader	Deputy Director International Division, Ocean Fishing Department, Fishery Agency Ministry of Agriculture, Forestry and Fisheries
Minoru TANAKA	Planning	Chief, Breeding Section, Nikko Branch, Fish Culture Research Institute, Fishery Agency
Satoru HIRASHIMA	Fishing equipment	General Manager, Ship's Engineering Department, Nichiro Gyogyo Co., Ltd.
Akinori SHIGENAKA	Fishery education equipment	Senior Staff manager, Ship's Engineering Department, Nichiro Gyogyo Co., Ltd.
Tadanobu YUMIBA	Fish culture equipment	Deputy Manager, First Project Team, Nichiro Gyogyo Co., Ltd.
Kenji ISHIWATA	Coordination	Councilor, Fisheries Technical Cooperation Division, Forestry and Fishery Development Cooperation Department, Japan International Cooperation Agency

2-2 Itinerary and Activities of the Mission

Day	Date	Places	Remarks
1st	Jul 31 (Thu)	Tokyo- New York	PA800.
		New York- Panama	EN979.
2nd	Aug 1 (Fri)	Panama-Quito	EN911.  Visit to Japanese Embassy; Finalization of the itinerary.
3rd	Aug 2 (Sat)	Quito	Arrangement for the study among the Mission members.
4th	Aug 3 (Sun)	Quito- Guayaquil	TAME157.
5th	Aug 4 (Mon)	Guayaquil	Courtesy visit to Fisheries Vice Secretary.  Discussion with the counter- parts with respect to the field survey.  Luncheon given by Fisheries Vice Secretary.  Visit to National Fisheries Institute.  Courtesy visit to Fisheries Directorate.  Dinner party given by the Mission.
6th	Aug 5 (Tue)	Guayaquil- Babahoyo	Visit to Babahoyo Technical College.  Visit to Fish Farm of Babahoyo Technical College.
		Babahoyo- Guayaquil	Visit to Cedege Fish Farm.
		Guayaquil- Manta	Discussion at National Fisheries Institute.

Day	Date	Places	Remarks
7th	Aug 6 (Wed)	Manta	Visit to Manta Fisheries School.  Discussion on the equipment to be furnished.  Observed trawling on board the SIRIUS.
8th	Aug 7 (Thu)	Manta	Visit to San Mateo Fishing Village.  Luncheon given by Manta Fisheries School-master.  Visit to Jaramijó Fishing Village.  Visit to a processing plant.  Dinner party given by the Mission.
9th	Aug 8 (Fri)	Manta-Quito	SAN156.
		Quito-Cotopaxi-Quito	Visit to Cotopaxi Fish Farm.  Back to Quito.
10th	Aug 9 (Sat)	Quito-Papallacta-Quito	Departed for Papallacta Fish Farm. Returned to Quito soon because of snowfall.
11th	Aug 10 (Sun)	Quito	Review of data so far collected.
12th	Aug 11 (Mon)	Quito-Otavallo	Visit to Punyaro Fish Farm.  Visit to Mojanda Fish Farm.  Luncheon given by Fisheries Vice-secretary.
		Otavallo-Quito	Back to Quito
13th	Aug 12 (Tue)	Quito-Cuenca	SAN150.  Visit to Chirimachay Fish Farm.

Day	Date	Places	Remarks
			Luncheon given by National Fisheries Institute.
			Compilation of the findings.
14th	Aug 13 (Wed)	Cuenca-Quito	SAN161.
			Talks with Ministry of Natural Resources and Energy and other government authorities.
15th	Aug 14 (Thu)	Quito	Discussion with Ministry of Natural Resources and Energy and other government authorities.
			Preparation of a draft list.
			Dinner party given by the Mission.
16th	Aug 15 (Fri)	Quito	Minutes drafted.
			Visited Japanese Embassy and reported on the survey results.
			Exchange of Minutes.
			Luncheon given by Ambassador (at the Embassy).
17th	Aug 16 (Sat)	Quito-Papallacta	Visit to Papallacta Fish Farm.
		Papallacta-Quito	Back to Quito.
18th	Aug 17 (Sun)	Quito	Review of collected data.
			Preparation for return to Japan.
			Visit to Embassy for final reporting.
		Quito-Miami	EUO72.
		Miami-San Francisco	EA501.

Day	Date	Places	Remarks
20th	Aug 19 (Tue)	San Francisco-	JAL001.
21th	Aug 20 (Wed)	- Tokyo	Arrived Tokyo.

2-3 List of Persons Met

I. Ecuador

(1) Ministry of Natural Resources and Energy

Econ. JOAQUÍN GONZÁLEZ Chief Vice-secretary

Ing. Com. TULY LOOR ARGOTE Fisheries Vice-secretary

(2) National Development Committee

Econ. GALO SALVADOR Chairman

Econ. EDUARDO CASTRO

Econ. ELIAS GUARANGA

Econ. EIVA FLORES

(3) Ministry Foreign Affairs

Dr. ADOLFO ALVAREZ Directors concurrently for  
Political Affairs and Economy

Dr. MARCELO HERVAS Director for Foreign Credit  
and Technical Aid

Sr. ARTURO ONTANEDA

(4) Office of the Fisheries Vice-secretary

Ing. MARCO CÓRDOVA Advisor

Sr. FRANCISCO GARCIA N. Chief,  
Andes East Culture Station

Econ. FLAUBERT ZUÑIGA Consultant

- |     |                              |  |
|-----|------------------------------|--|
|     | Sr. EDUARDO BARRAGÁN         | Consultant                                   |
|     | Snta. LEONOR DILLON          | Secretary                                    |
| (5) | Fisheries Directorate        |  |
|     | Sr. MARCOS ZAMBRANO Z.       | Director                                     |
|     | Econ. ANDRES ESTRELLA        |  |
| (6) | National Fisheries Institute |  |
|     | Dr. ROBERTO JIMÉNEZ S.       | Chief  |
|     | Dra. LUCIA SOLORZANO         |  |
|     | Sr. ALBERTO REYES            |  |
|     | Sr. ONASIS NARANJO           |  |
| (7) | Manta Fisheries School       |  |
|     | Egdo. VICENTE GONZÁLEZ T.    | Acting Schoolmaster                          |
|     | Ing. EDGAR OCAMPO V.         | Acting Vice-schoolmaster                     |
|     | Ing. MANUEL BAYAS G.         | Officer for Management                       |
|     | Ing. FREDDY BARREIRO C.      | Chief,<br>Industrial Fisheries<br>Department |
|     | Dr. PEDRO VITERI A.          | Chief,<br>Artisanal Fisheries<br>Department  |
|     | Sr. JIMER GARCÍA C.          | Teacher for Fisheries                        |
|     | Sr. JOSÉ MACÍAS C.           | Teacher for Fisheries                        |
|     | Sr. DIEGO ARTEAGA T.         | Teacher for Technology                       |
|     | Sr. HOMERO VILLAFUERTE       | Interpreter                                  |
| (8) | Fisheries Public Corporation |  |
|     | Ing. JORGE ADUM B.           | Manager                                      |

## II. Japanese Embassy

Yoshi YASUI

Ambassador Extraordinary  
and Plenipotentiary

Kazunori UNO

First Secretary

Teruyuki ISHIKAWA

### 2-4 Outline of Discussions

The mission had an initial talk with the government authorities of Ecuador, at the office of the Fisheries Vice-Secretary, on August 4.

At this initial talk, the mission explained the purpose of the visit, and confirmed the items of requests from Ecuador.

Then, the discussions were held on priorities to be given to different equipment in the event of any additions or changes of the items on the list which might be proposed during the field visit.

Subsequently, the schedule of the mission's field survey was finalized and counter parts for the mission were nominated.

As shown in the attached itinerary, the field survey was conducted first at the National Fisheries Institute and Manta Fisheries School, and then after returning to Quito once, visits were made to fish farms in the mountainous area of the Andes from August 8 to 13.

After the field surveys, the mission presented its views to the Ministry of Natural Resources and Energy at the meeting in Quito on August 13 and 14. Discussions were also held with the personnel representing various government organizations concerned in order to draft an equipment list.

The discussions at the meeting dealt with, among others, matters as follows:

1. Problem of handling and maintenance of sophisticated equipment;
2. Basic view on the large pump (450 mm diameter) to be used in the fish culture pond and on the quality and quantity of the water;
3. Selection of site for fish culture pond; and
4. Arrangements by which the delivery of the equipment would be made at the port of arrival and the responsibility for subsequent storage and maintenance would be on the part of Ecuador, except for two types of equipment for which some adjustment would be required after installation.

Subsequently a further consultation was held in the presence of the Fisheries Vice-secretary and the final list of equipment was agreed upon.



2-5 Minutes

The mission had a series of talks with the Office of Fisheries Vice-secretary and other organizations concerned, while field surveys were made at various places. Based on the results of such talks and surveys, the attached minutes were prepared and agreed on August 15 between Ing. Com. Tuly Loor Argote, Fisheries Vice-secretary of the government of the Republic of Ecuador and Mr. Satoru Koakutsu, Leader of the mission, with their signatures affixed duly in the presence of Mr. Yasui, Ambassador of Japan and Econ. Joaquín González, chief Vice-secretary of the Ministry of Natural Resources and Energy.



MINUTES OF DISCUSSIONS

ON

THE BASIC DESIGN SURVEY FOR FISHERIES DEVELOPMENT RESEARCH  
AND TRAINING PROJECT IN THE REPUBLIC OF ECUADOR

At the request of the Government of Ecuador for the grant to the development of fish culture and fishery training programme, the Government of Japan has dispatched the survey team, headed by Mr. Satoru Koakutsu, which stays to conduct basic design survey in Ecuador from July 31st to August 20th, 1980.

During the stay in the Republic of Ecuador, the team had a series of visits and discussions with the Subsecretaría de Recursos Pesqueros, CONADE and the other Ecuadorian authorities concerned on the fishery development.

As the result of the discussions the team and the Ecuadorian counterpart have agreed to recommend to their respective governments the matters referred to in the list of equipments attached hereto.

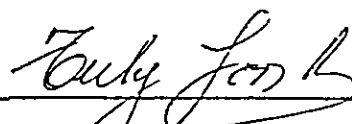
The maintenance and operation of these equipments mentioned in the list will be made by the Government of the Republic of Ecuador.

August 15th, 1980

Quito, Republic of Ecuador



Mr. Satoru Koakutsu  
Head of the Japanese Basic  
Design Survey Team



Ing. Com. Tully Llor Argote  
Subsecretaría de Recursos  
Pesqueros  
Ministerio de Recursos Naturales  
y Energéticos



"EL ECUADOR HA SIDO,  
ES Y SERA PAIS AMAZONICO"

REPUBLICA DEL ECUADOR  
MINISTERIO DE RECURSOS NATURALES Y ENERGETICOS  
SUBSECRETARIA DE RECURSOS PESQUEROS

PROYECTO DE COOPERACION TECNICA NO REEMBOLSABLE  
ENTRE LA REPUBLICA DEL ECUADOR Y EL GOBIERNO -  
DEL JAPON

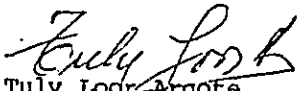
ACTA SOBRE EL TRABAJO REALIZADO POR LA MISION DEL GOBIERNO DEL JAPON Y LA  
CONTRAPARTE DE LA REPUBLICA DEL ECUADOR.-

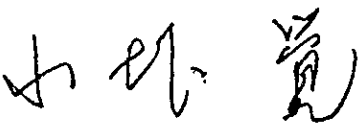
En respuesta a la solicitud de Cooperación Técnica no Reembolsable para el Desarrollo de la Piscicultura y Capacitación Pesquera, presentada por el - Gobierno del Ecuador, el Gobierno del Japón envía una Misión presidida por el señor Storu Koakutsu, con el objeto de definir y formular los lineamientos de dicha colaboración, la misma que permanece en el Ecuador desde el 31 de julio hasta el 20 de agosto del presente año, trabajando en forma - conjunta con la Subsecretaria de Recursos Pesqueros, y CONADE, organismo - que constituye la Contraparte Nacional, habiéndose realizado visitas a los proyectos en donde se implementará la cooperación técnica, además han mantenido reuniones de trabajo con las autoridades del Sector Pesquero.

Como resultado de las labores realizadas por la Misión y la Contraparte - Ecuatoriana, se han elaborado las listas de las maquinarias, equipos e implementos que comprendería la cooperación técnica, no reembolsable, y que las partes recomiendan a sus respectivos Gobiernos.

El mantenimiento y operación de las maquinarias, equipos e implementos mencionados en las listas correspondientes será de responsabilidad del Gobierno de la República del Ecuador.

Quito, a 15 de agosto de 1980

  
Ing. Com. Tuly Loor Argote  
SUBSECRETARIA DE RECURSOS  
PESQUEROS

  
Sr. Satoru Koakutsu  
JEFE DEL GRUPO DE ENCUESTAS  
BASICAS DE DISEÑO

ld.

EQUIPOS PARA EL INSTITUTO NACIONAL DE PESCA

(PROYECTO CENTRAL)

<u>ORDINAL</u>	<u>CANTIDAD</u>	<u>DESCRIPCION</u>
01	uno	Cromatografía de gases *
02	uno	Contador de centelleo líquido
03	uno	Coulter counter
04	una	Lámpara ultravioleta
05	uno	Micro-balanza
06	uno	Respirómetro
07	uno	Destilador de agua automático
08	uno	Analizador de amino-Ácidos *
09	uno	Analizador automático de Carbono, Nitrógeno y Oxígeno
10	uno	Cromatografía de capa fina:
11	uno	Micrófono de congelación
12	una	Cámara de temperatura controlada
13	uno	Autoclave automático
14	una	Bomba de vacío
15	uno	Desecador a bajas temperaturas (Freeze Drier)
16	uno	Pirómetro
17	una	Sorbona
18	una	Lavadora de material de vidrio
19	uno	Calorimeter
20	uno	PH meters
21	uno	Electrodo. de catione monovalente
22	cinco	Sistemas de acuario (compresores, filtros, oxigenadores, reguladores de temperatura)
23	uno	Sumersible Pump
24		Tubos plásticos para cultivos de algas
25	uno	Carro con congelador (Frigorífico)
26	uno	Material de vidrio para cultivos de microalgas y fitoplancton, incluye frascos para cultivos
27	uno	Barco de alrededor de 12 metros de longitud para recoger muestras para ensayo experimental
28	cuatro	Refrigeradoras portátiles.
29	uno	PH meter portátil
30	cuatro	Balanzas
31	una	Imprenta Offset
32	-	Redes de plancton para ríos, lagunas y estanques
33	uno	Jeep
34	una	Furgoneta
35	uno	Microscopio y estereomicroscopio con cámara clara
36	uno	Proyector de transparencia
37	uno	Proyector de imágenes de microscopio

*Fully for B*

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EQUIPOS PARA EL INSTITUTO NACIONAL DE PESCA

(PROYECTO CENTRAL )

<u>ORDINAL</u>	<u>CANTIDAD</u>	<u>DESCRIPCION</u>
38	una	Grabadora
39	uno	Betamax
40	uno	Equipo para filmadora
41	tres	Calculadoras manuales
42	una	Cámara fotográfica
43	uno	Equipo para revelado, copia y proyección de fotografías.

Los equipos serán entregados en puerto excluyéndose los que llevan la señal (\*) que serán instalados por el Gobierno del Japón.

*Andy Ferrer*

Quito, a 14 de agosto de 1980.

Id.

(17)

EQUIPOS PARA EL INSTITUTO NACIONAL DE PESCA

MATERIALES PARA LA ESTACION PISCICOLA PARA CALLEJON INTERANDINO

ORDINAL	CANTIDAD	DESCRIPCION
01	una	Materiales para casa prefabricada 150 m <sup>2</sup>
02	una	Planta eléctrica portátil
03	dos	Jeeps con doble transmisión (tanque para transporte peces)
04	uno	Microscopio
05	uno	Esteroscopio
06	una	Balanza analítica
07	una	Balanza normal
08	una	Balanza grande
09	una	Bomba de succión de agua 3 pulgadas
10	dos	pH. (medidor portátil)
11	dos	Medidores de oxígeno
12	uno	Lancha de motor
13	dos	Aparatos de incubación para experimentación sistema vertical.
14	uno	Bote de goma
15	una	Carpa de campaña capacidad 5 - 10 personas
16	una	Cocina a gas
17	cinco	Red para río (Plancton)
18	uno	Red para estanque
19	una	Bomba hidráulica de 18 pulgadas.

*Buby Jork*

Quito, a 14 de agosto de 1980  
ld.

EQUIPOS PARA LA DIRECCION GENERAL DE PESCA

	COTOPAXI	PUNVARO	PAPALLACTA	ISLA JOSEFINA	CEDEGE	ESPOCH	UT.
01	no	1 (50m <sup>2</sup> )	2 (de 100m <sup>2</sup> ) 1 (de 50m)	1 (100m <sup>2</sup> ) 1 (50m)	-	-	1 (100m <sup>2</sup> )
02	2	1	1	1	-	-	1
03	1	1	1	1	-	-	1
04	1	1	-	-	-	-	-
05	1	1	1	1	1	1	1
06	1	1	1	1	1	1	1
07	-	1	1	1	1	-	1
08	-	1	1	1	1	-	1
09	5	3	3	3	-	5	5
10	5	3	3	3	-	5	5
11	5	3	3	5	-	-	5
12	5	3	3	3	-	1	5
13	2	2	2	-	-	2	-
14	2	2	2	2	-	2	2
15	3	3	3	3	1	1	1
16	1	1	1	1	1	-	-
17	1	1	1	1	1	-	-
18	1	1	1	1	1	-	-
19	1	1	1	1	1	1	1

*Enly Lopez*

.../...



EQUIPOS PARA LA DIRECCION GENERAL DE PESCA

	COTOPAXI	PUNVARO	PAPALLACTA	ISLA JOSEFINA	CEDEGE	ESPOCH	UTB.
20	1	1	2	1	2	-	-
21	1	1	1	1	-	-	-
22	1	1	1	1	-	-	-
23	1	1	1	1	-	-	-
24	1	1	1	1	-	-	-
25	2	2	2	2	-	-	-
26	1	1	1	1	-	1	1
27	1	1	1	1	-	-	-
28	4	4	4	4	-	2	4
29	Equipo de filmación de 16 milímetros (uso general)						
30	Proyector de 16 milímetros (uso general)						
31	Dos microscopios (uso general)						
32	Dos estereomicroscopios (uso general)						
33	Megáfonos (uso general)						

*Ruby Jacob*

Quito , a 14 de agosto de 1980  
Id.

EQUIPOS PARA LA ESCUELA DE PESCA DE MANTA

I.- CAPACITACION DE PESCADORES ARTESANALES E INDUSTRIALES.

Unidades, Equipos e Implementos

01, UNIDADES MOVILES DE ENTRENAMIENTO

- 01.1. Unidad móvil para entrenamiento del sondeo acústico en la pesca y navegación:  
Sonar  
Radar  
Ecosonda  
Radiogoniómetro  
Radio./
- 01.2.- Unidad móvil de entrenamiento para aparejos y materiales de pesca:  
Construcción y reparación de redes  
Construcción y reparación de aparejos  
Muestrario de equipo de amarre y fondeo.
- 01.3.- Unidad móvil para entrenamiento; mecánico, hidráulico, eléctrico y sistemas de frío:  
Motor didáctico diesel  
Unidades (partes) del sistema hidráulico  
Tableros didácticos de electricidad  
Tableros de simulación de fallas  
Tableros de circuitos de refrigeración  
Muestrario de refrigerantes; características y utilización

II. PARA IMPLEMENTACION DE LAS INSTALACIONES DE LA ESCUELA

Máquinas, Equipos E Implementos.

02. MAQUINAS:

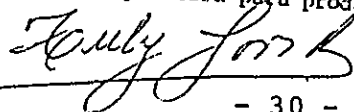
- 02.1. Winche didáctico (cerco-arrastre)  
02.2. Maquinillas de pesca (Line Hauler, Net hauler, etc.)  
02.3. Motor didáctico de plástico a diesel  
02.4. Motores hidráulicos  
02.5. Máquinas de impresión para publicaciones de material didáctico e información.  
02.6 Winches de orza de amantillo  
02.7 Motores diesel diferentes marcas y H.P. (3)  
Motores Fuera de Borda diferentes marcas y H.P.(3)

03. EQUIPOS:

- 03.1. Equipo oceanográfico:  
Termógrafo/  
Batitermógrafo  
03.2. Equipo de soldadura eléctrica y autógena  
03.3. Equipo para limpieza de inyectores  
03.4. Equipo de herramientas para mecánica, electricidad y refrigeración  
03.5. Equipos de buceo completos (6 juegos)

04. IMPLEMENTOS:

- Video tape  
Comprobador de inyectores (0-400 ks/cm<sup>2</sup>)  
Bombas de achique de transferencia  
Válvulas hidráulicas  
Voltímetros, amperímetros reostatos  
Compresores de amoníaco y freón  
Modelos de instalación de frío varios sistemas (freón 22, amoníaco, brine, etc.)  
Sistemas de propulsión completo (eje, propela, etc)  
Equipos para trabajos a bajas temperaturas  
Medidores de temperatura para productos frescos y congelados (Thermometer).

  
- 30 -

EQUIPOS OPCIONALES

Instituto Nacional de Pesca

uno            Esteroscopio  
Veinte y seis    Tinas de fibra de vidrio (incubadoras)

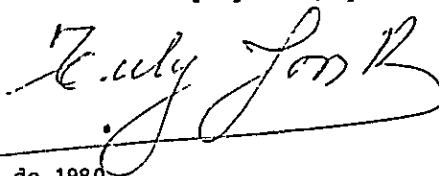
uno            Computador

Dirección General de Pesca

uno            Tractor

uno            Excavador

uno            Bomba eléctrica de 4 pulgadas (Papallacta)

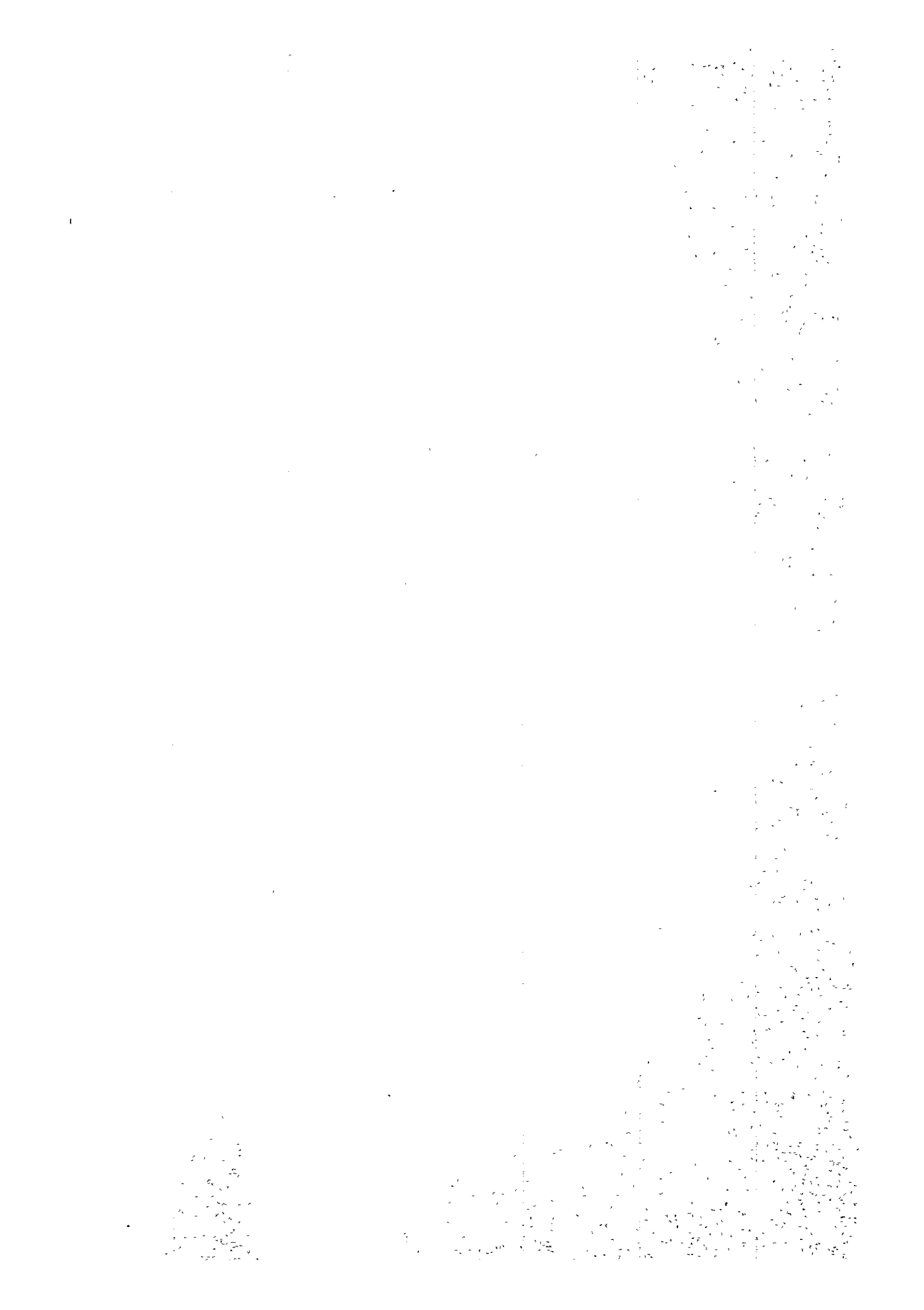


Quito, a 14 de agosto de 1980  
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### Chapter 3    Equipment Proposed for Grant



### Chapter 3. Equipment Proposed for Grant

Grant of equipment to Ecuador for research, and education and training on Fisheries is intended mainly for the development and promotion of marine fisheries, while equipment for the improvement of fish farms aims at development and promotion of the inland water fisheries in the Andes as a part of the industrial development in mountain areas.

The mission found, from the interviews and discussions with the Fisheries Vice-secretary, Director of the Fisheries, Chief of the National Fisheries Institute and Master of the Manta Fisheries School, that all these government authorities concerned had consistent views on fisheries development projects and were exerting their utmost efforts for the successful completion of the projects.

The mission was also of the view that the equipment being requested by them were generally adequate and practical. However, funds available to the Japanese Government for the fishery grant are limited and it is difficult to furnish all of the equipment requested.

The mission therefore discussed with the requesting organizations and fully examined the possible effect and usefulness of the equipment and came to the conclusion that the grant of the equipment listed below would be most pertinent:

List of equipment to be granted

<u>Recipient</u>	<u>Description</u>
National Fisheries Institute	43 Items (See Appendix)
Fish Farms in Andes	19 Items (See Appendix)
Fisheries Directorate Fish Farms	33 Items (See Appendix)
Manta Fisheries School	A mobile unit of equipment for education in fishing and navigation.
	A mobile unit for education in fishing implements
	A mobile unit of equipment for education in machine, hydraulics, electricity and refrigeration
	School equipment
	Machines 8 Items (See Appendix)
	Equipment 5 Items (See Appendix)
	Implements 10 Items (See Appendix)

Optional items

National Fisheries Institute	3 Items (See Appendix.)
Fisheries Directorate	3 Items (See Appendix.)

The foregoing grant is classified largely into the following 6 items.

1. Equipment for National Fisheries Institute
2. Equipment for Fisheries Directorate



3. Equipment for Manta Fisheries School
4. Freight charge
5. Charges for packing, insurance, and export handling
6. Consultant fee

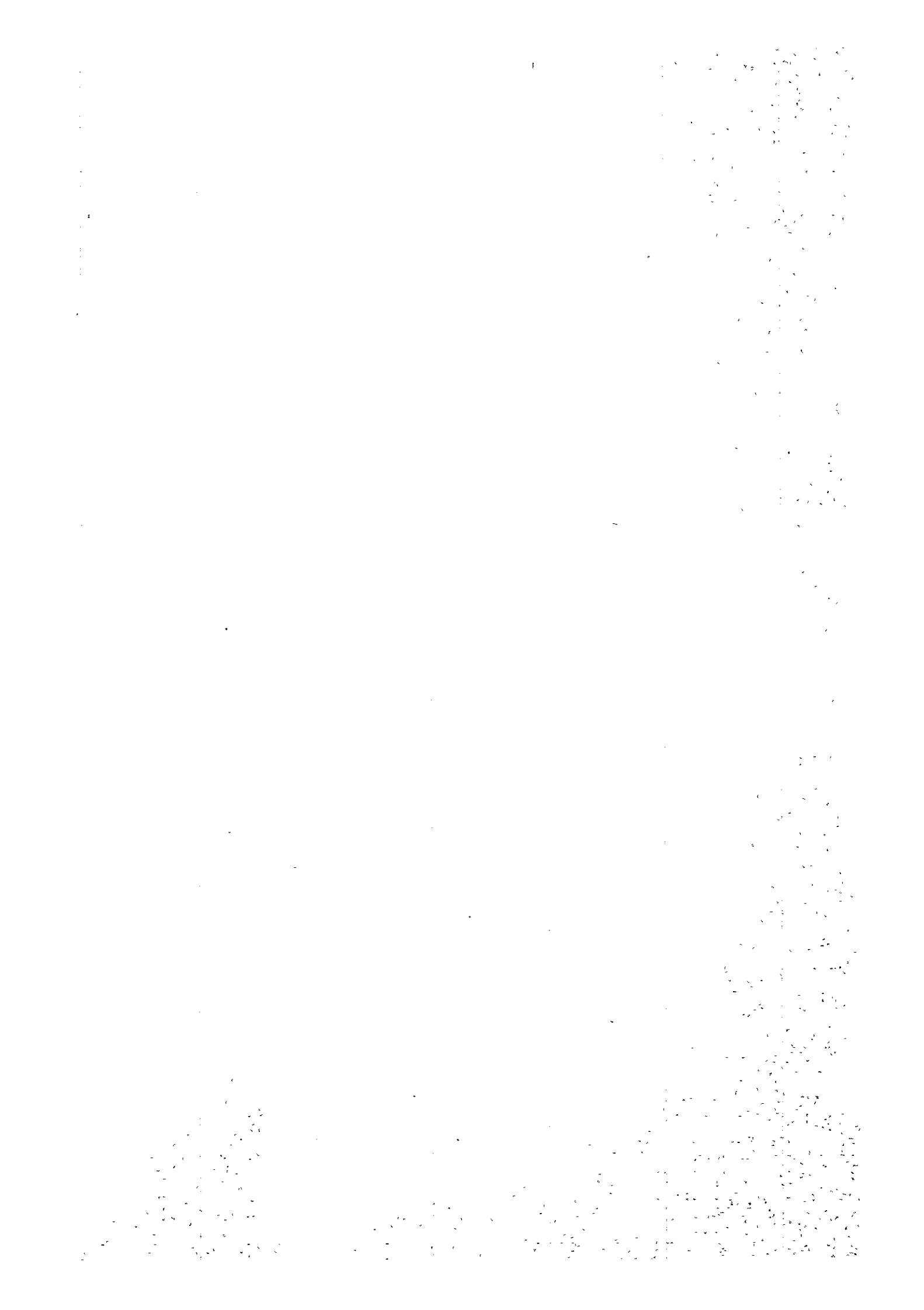
Equipment under item 1 will be used mainly for research, those under item 2 will be used by the Fishery Administration for regional fishery development as provided in the fisheries law, while the equipment under item 3 are designed for education of the fishermen.

The foregoing allocation is considered to be adequate from the present condition and prospect of the fishery development in Ecuador.

Optional items will be granted if and when there is any surplus of funds for purchase of equipment.



**Chapter 4      Possible Effect of Equipment Proposed**



#### Chapter 4. Possible effect of Equipment Proposed

The Republic of Ecuador formulated a fisheries development program as a part of the Five year National Development Plan which came into force on March 8, 1980.

Main objectives of the program include better supply of foods for the people, achievement of the export target, securing livelihood for small fishermen and regional development. In this connection, the Government of the Republic of Ecuador plans to invest in the following fields:

- 1) Inshore fishery for food fish production;
- 2) Fishery training (contribution to the cost under international agreement);
- 3) Inland water fish culture; and
- 4) Construction of fishing ports.

The present study by the mission concerned the items 2) and 3) mentioned above and, additionally, equipment required for the National Fisheries Institute.

The list of the equipment to be granted was determined after full consultation with the responsible persons of the National Fisheries Institute, Fish Farms and the Fisheries School.

The Fisheries Vice-secretary of the Ministry of Natural Resources and Energy undertook in the minutes, effective use as well as adequate management and maintenance of these equipment as the responsibility on the part of Ecuador.

Under the circumstances, the following effect will be expected of the granted equipment.

#### 4-1 National Fisheries Institute

The National Fisheries Institute is in possession of excellent equipment and seems to be producing appreciable results. However, in view of the development of gas field in the south of Guayaquil and other industrial development projects including construction of a fertilizer plant that may cause water pollution in the near future, a more systematic and larger scale survey is considered necessary for conservation and development of marine resources of Ecuador.

The equipment to be granted are those required for a series of research work ranging from sampling and of materials to compilation and reporting of the findings.

Should the equipment be used effectively, the research activities will improve and contribute greatly not only to maintenance and expansion of marine resources but also to the promotion of the fisheries industry of this country.

#### 4-2 Fish Farms belonging to the National Fisheries Institute

The equipment to be granted range from a prefabricated house, portable power generator and other equipment for to improve living conditions in mountainous and remote districts to equipment for catching parent fishes incubators and various other instruments required for research and experiment.

Therefore, if they are installed at appropriate places, it is expected that fry would be mass-produced, while related research could be carried out.

This will be a step forward towards increasing the supply of protein foods and the industrial development in the mountain areas of the country.

#### 4-3 Fish Farms belonging to the Fisheries Directorate

It is proposed to supply the equipment as listed to the five fish farms visited by the mission and other fish farms on Josefina Island and at Espoch of which no survey was conducted because of time limitation.

The equipment are substantially similar to those proposed for the fish farms belonging to the National Fisheries Institute, comprising prefabricated houses for living purpose and hatching test, generators for lighting and power, boats for catching parent fishes, fishing nets, hatching tanks, microscopes, cameras and measuring instruments for physiological examination of fishes, jeeps for transport of young and parent fishes and for communication and pumps to take in

and discharge water at the fish farms.

With these equipment, it will be possible for the government to implement plans for fish farm development in an integrated manner.

#### 4-4 Manta Fisheries School

The educational standard of the people in the country is generally low because of low percentage of school attendance.

It is particularly so for fishermen, as fishing village are located in remote places.

To promote the domestic fisheries under such circumstances, it is imperative to improve the fishermen's vocational training.

Last year, a training boat was granted to Ecuador by the Government of Japan, and on board training has proved a great success in teaching modern fishing techniques.

Educational equipment and materials to be granted will reinforce the existing equipment and serve to increase the number of trained personnel to meet the increasing need to man the fishing boats.

It is also planned to conduct training of fishermen by means of mobil units of cars mounted with fishing gears and navigation instruments.



Grant of such mobil educational vehicles will prove most useful for the fishery education project and contribute greatly to the development of inshore fishery.

#### 4-5 Eastern and Other Districts

In the foregoing, possible effect of the grant has been reviewed for several specific cases.

However, as stated in detail in the annexed document, "Background and Surrounding Circumstances of Fisheries Development Program", conservation and exploitation of the natural resources are the basis for growth of the Republic of Ecuador. Thus, it is obvious that exploitation of resources will not only improve individuals' living standard but contribute to rectifying regional differences through balanced regional development, which is a step forward toward economic integration and development as a nation.

It is expected that the grant aid proposed may help in this respect to a great extent.

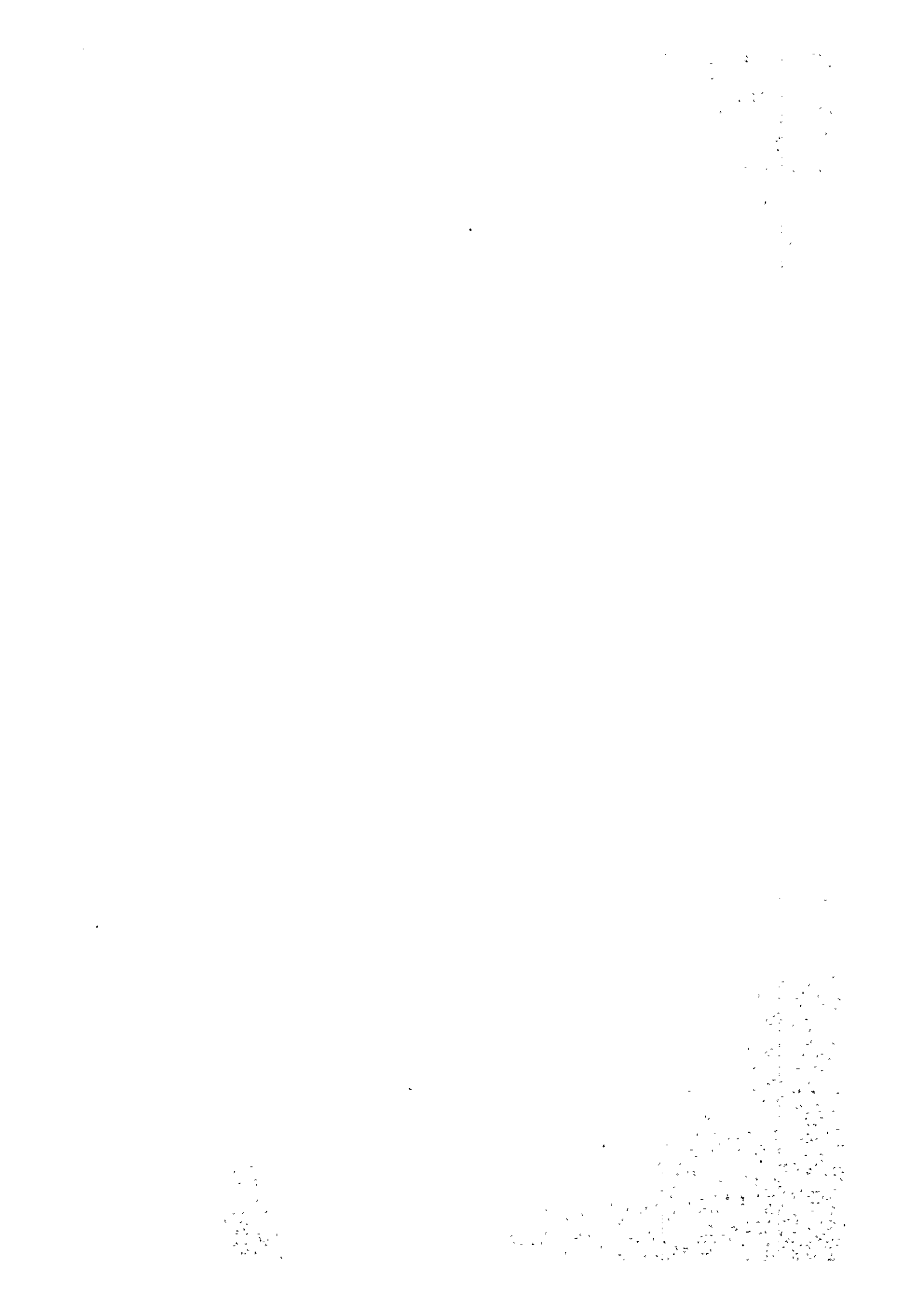
As to fish culture, the Andes mountain districts are considered suitable areas in both water temperature and water quality.

There are many lakes having water abundantly.

Nevertheless, the districts are left untouched because of lack of funds as well as trained personnel.

Grant of the equipment will immediately serve to train fish culturists and to conduct required surveys, which may lead to the regional development of the Andes areas.

## Chapter 5 Recommendations



## Chapter 5. Recommendations

Hoping that the granted equipment will have a good effect, the mission would like to state some points which should be taken into consideration by the government of the Republic of Ecuador.

- (1) In order to ensure an effective use of the granted equipment, Ministry of Resources and Energy, CONADE, National Fisheries Institute, Fisheries Directorate and Fisheries School should maintain a close contact and cooperate so that best results would be produced.
- (2) For the purpose of maintenance and management of the equipment granted, skilled personnel should be placed, while necessary budgetary measures should be taken as soon as practicable.
- (3) As to the development and improvement of fish farms, several selected ones should be given priority and installed intensively with the equipment.  
Additional fish farms could be taken up, once the initial ones have produced appreciable results.

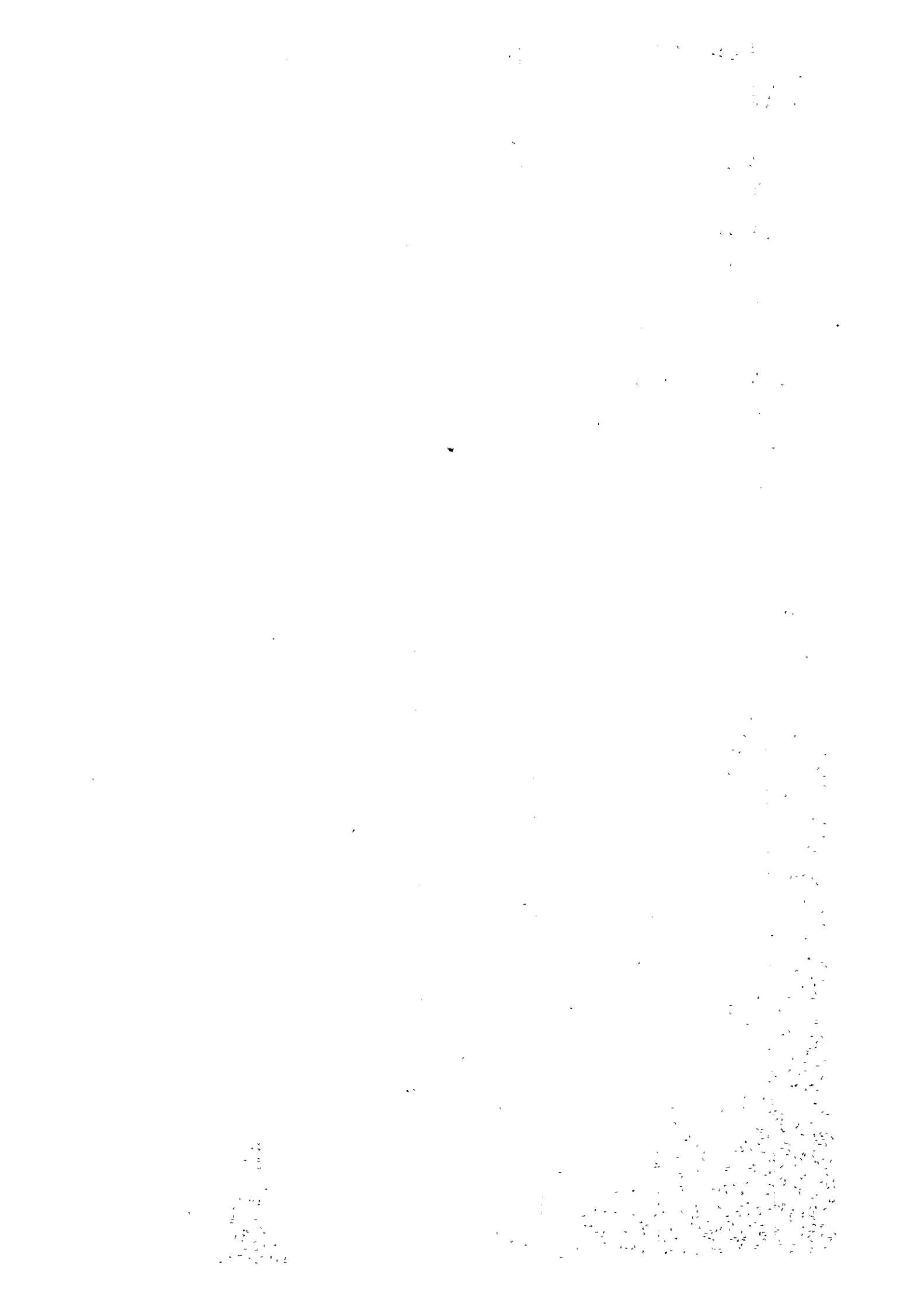
For example, CEDEGE Fish Farm should be left out for the time being with priority given to BABAHOYO Technical College Fish Farm, while CHIRIMACHAY Fish Farm should be taken up in precedence to MOJANDA Fish Farm.

(4) When selecting sites of fish farms, due consideration should be given to the water temperature, quality and quantity, which are fundamental elements in fish farming. With respect to fish farming ponds, it is preferable to use water of natural flow, avoiding pumping up of water, so far as practicable.

Particularly, pumping up of water should not be considered in fish farms located in mountain areas or remote districts, where there are difficulties in power supply.

(5) Among the educational equipment for the Fisheries School, there are mobile units which are mounted with precision instruments. Therefore, when they are used in remote districts with poor road conditions, care should be taken in their operation and maintenance so that the instruments may not be damaged by jolting of the car.

**APPENDIX**





## APPENDIX

### Particulars of Equipment Proposed for Grant

Particulars and the specifications of machinery and equipment required for fisheries research, fisheries education and at the fish farms in the Republic of Ecuador are given below.

Equipment for the National Fisheries Institute

Designation	Quantity	Remarks
(1) Gas chromatograph	1	Expert to be sent for installation and test run.
(2) Spectrophotometer	1	
(3) Blood cell counter	1	
(4) Ultraviolet lamp	1	
(5) Microbalance	1	
(6) BOD measuring instruments	1	
(7) Automatic water distiller	1	
(8) Amino acid analyzer	1	Expert to be sent for installation and test run.
(9) Automatic carbon, nitrogen and oxygen analyzer	1	
(10) Thin layer chromatograph	1	
(11) Freeze microtome	1	
(12) Sterilizer	1	
(13) Automatic autoclave	1	
(14) Vacuum pump	1	
(15) Freeze dryer	1	
(16) Pyrometer	1	
(17) Fume hood	1	
(18) Automatic glassware washer	1	
(19) Calorimeter	1	
(20) pH meter	1	

	Designation	Quantity	Remarks
(21)	Univalent cationic electrode	1 set	
(22)	Water tanks	5	
(23)	Sea water taking pump	1	
(24)	Aeration tubes	1 set	
(25)	Refrigerator car	1	
(26)	Laboratory dishes	1 set	
(27)	Sampling boat, 12m long	1	
(28)	Portable thermo bags	4	
(29)	Portable pH meter	1	
(30)	Balances	4	
(31)	Offset printing press	1	
(32)	Plankton net	1	
(33)	Jeep	1	
(34)	Micro bus	1	
(35)	Microscope with camera	1 set	
(36)	Overhead projector	1	
(37)	Interchangeable lens for projection microscope	1	
(38)	Tape recorder	1	
(39)	Video cassette recorder	1	
(40)	16 m/m movie camera	1	
(41)	Electronic calculators	3	
(42)	Camera	1	
(43)	Developing implement	1 set	

Equipment for the Fish Farm in  
Andes Mountainous District

Designation	Quantity	Remarks
(1) 150 m <sup>2</sup> prefabricated house	1	
(2) Portable generator	1	
(3) Jeep with fish carried tanks	2	
(4) Microscope	1	
(5) Stereo-microscope	1	
(6) Analytical balance	1	
(7) Normal balance	1	
(8) 50 kg balance	1	
(9) 3" suction pump	1	
(10) Portable pH meters	2	
(11) DO meters	2	
(12) Boat with motor	1	
(13) Vertical incubator	2	
(14) Rubber boat	1	
(15) 5-10 persons tent	1	
(16) Gas range	1	
(17) Plankton nets	5	
(18) Culture net	1 set	
(19) 18" pump	1	

Equipment for the Fish Farms belonging to  
Fisheries Directorate

	Designation	Quantity	Remarks
(1)	Prefabricated houses 50m <sup>2</sup>	3	
	" 100m <sup>2</sup>	4	
(2)	30 KW generators	4	
(3)	Air compressors	5	
(4)	2" Submerged pumps	2	
(5)	2" Engine drive pumps	2	
(6)	Jeep with fish carried tanks	7	
(7)	Boat with 40 HP outboard motors	3	
(8)	Rubber boat with 20 HP outboard motors	3	
(9)	Dragnets for fry	24	
(10)	Dragnets for young fishes	24	
(11)	Dragnets for adult fishes	21	
(12)	Plankton nets	20	
(13)	Vertical incubators	8	
(14)	Aerators	12	
(15)	Counters	15	
(16)	Microscopes	5	
(17)	Stereo microscope	5	
(18)	Cameras	5	
(19)	Fish measuring boards	7	
(20)	Dissecting instruments	7	

	Designation	Quantity	Remarks
(21)	Glasswork kits	4	
(22)	Sterilizers	4	
(23)	Refrigerators	4	
(24)	Water analyzers	4	
(25)	Balances	8	
(26)	Meat choppers	6	
(27)	Ultraviolet ray sterilizers	4	
(28)	Thermo bags	22	
(29)	16 m/m movie camera	1	
(30)	16 m/m projector	1	
(31)	Microscopes	2	
(32)	Stereo microscopes	2	
(33)	Hand microphones	2	

Equipment for Manta Fisheries School

Designation	Quantity
<hr/>	
1. Mobile Educational Equipment	
<hr style="border-top: 1px dashed black;"/>	
(1) Mobile unit for education in sensing devices for fishing and sailing	1
Equipment to be installed:	
Soner	
Radar	
Sounder	
Direction finder	
Radio	
(2) Mobile unit for education in fishing net and materials	1
Equipment to be installed:	
Fishing net manufacturing and repair tools	
Materials manufacturing and repair tools	
Samples of mooring cable and anchoring equipment	
(3) Mobile unit for education in machinery, hydraulic, electricity and refrigeration	1
Equipment to be installed:	
Educational diesel engine	
Hydraulic apparatus	
Educational charts of electricity	
Failure simulation charts	
Refrigerator circuit diagram	
Samples for characteristics and application charts of refrigerant	

Designation	Quantity
<b>2. Machinery</b>	
-----	
(1) Educational winch	1 set
(2) Fishing machines	1 set
(3) Model diesel engines	
Plastic 4-cycle engine	1
Plastic 2-cycle engine	1
(4) Hydraulic motor	Included in item (2).
(5) Educational printing press	1
(6) Winch	1
(7) Diesel engines	3 sets
Outboard motors	3 sets
-----	
<b>3. Equipments</b>	
-----	
(1) Oceanographic instruments	
Recording thermometer	1
Recording thermometer for deep water	1
(2) Electric and gas welding machines	
Electric welding machine	1
Gas welding machine	1
(3) Injector washing device	1
(4) Tools for machines, electricity and refrigeration	1 set
(5) Diving apparatus	6 sets



Designation	Quantity
4. Implements	
(1) Video tape recorder	1
(2) Fuel injection valve test apparatus	1
(3) Mobile small pumps	3
(4) Hydraulic valve	1 set
(5) Voltage, current and resistance tester	1
(6) Ammonia and Freon compressors	
Ammonia compressor	1
Freon compressor	1
(7) Freon, ammonia and brine refrigerator models	1 set
(8) Propulsion shaft device	1 set
(9) Low temperature work implements	10 sets
(10) Freezed product temperature measuring thermometer	1

Optional Equipment

Designation	Quantity
<hr/>	
National Fisheries Institute	
<hr style="border-top: 1px dashed black;"/>	
(1) Stereo microscope	1
(2) Fiber glass tanks	26
(3) Computer	1
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Fisheries Directorate	
<hr style="border-top: 1px dashed black;"/>	
(1) Bulldozer	1
(2) Power shovel	1
(3) 4" Motor pump	1



JICA