

It has been instrumental in promoting the increase in the services for potable water in rural areas, the sanitary disposal of night soil, the collection and disposal of solid waste, the sanitary control of raw and processed foods and the establishment of regulations for water pollution control. The organization chart of SENASA is shown in Annex III.

2.2 Solid Waste Management

The solid waste management in the Asuncion Metropolitan area is summarized in Table 1. Although the level of SKM in Asuncion is the highest in the Metropolitan Area, it is not satisfactory and as example, the present condition of the solid waste management of Asuncion is reported as follows :

The area of Asuncion is approximately 117 km² and is divided into 9322 blocks, of which 6962 blocks are paved while 2360 are not. Almost all housing located on paved roads are serviced with solid waste collection. There are 47 collection zones, 3 zones in the commercial areas and 44 zones in the residential areas.

The frequency of collection is as follows :

- Daily in the commercial area
- Three times a week in residential areas

According to the census, approximately 67,000 families are being serviced, and the average daily volume collected per day is 1005 m³.

All solid wastes, including domestic and some industrial residues, are disposed of at the present in Laguna Cateura disposal site by the controlled tipping landfill operation which is not fully sanitary.

The Urban Cleaning Department includes 37 technical and administrative personnel and 375 workers. There are 28 packer trucks, 4 open trucks for collection and 1 sweeper-aspirator.

It is necessary to improve the service ratio of waste collection due to urban expansion. There is a need, therefore, for more equipment and personnel.

The present Laguna Cateura landfill site, which was identified by the World Bank consultant, is located within the municipality of capital city and is only 15 km away from the center of the city.

It is estimated that an average of 30,000 m³ of waste is deposited per month and that the present disposal site can last for 30 years.

Individuals are also allowed to discharge waste, as well as company trucks from industries or others institutions. Daily fumigation is performed and a mechanical tumble-leveler runs on the garbage piles daily. However, there are some objections raised from the citizens due to the inadequate sanitary landfill operations; i.e. the lack of enclosing facilities, leachate collection and treatment facilities, etc.

Table 1 Solid Waste Management In the Asuncion Metropolitan Area in 1988

N°	CITIES	URBAN	SERVED	TOLUACEN	PER	TYPE	VEHICLE	TYPE	AFFECTED PERSONNEL				MUNICIPAL			
		POPULA	POPULA	COLL/DAT	CAP.	OF	TYPE	OF SER	VICE	ADM.	X.R.	TEC.	TRAINEO	USI		
		1104	1104	(a3)	PROD.	DISPOSAL	N°	TYPE								
1	Asunción	465000	335000	72	1005	1.00	Not sea.	33	28	A	Avaic.	35	375	2	320	7000000
2	S. de la Borja	44810	42000	42	1	0.80	Kol sea.	3	2	C	Priv.	1	13	2	2	38705
3	San Lorenzo	74351	15000	23	31	0.45	Not sea.	2	1	A	Avaic.	3	22	1	7	35334
4	Luque	24112	13141	53	32	0.40	Not sea.	2	1	B	Priv.	2	12	-	2	45112
5	Luque	45115	45000	49	31	0.40	Not sea.	2	1	A	Priv.	1	4	-	2	50474
6	Villa Elisa	472	-	-	-	-	-	-	-	-	-	-	-	-	-	1503
7	Carandubé	4524	-	-	-	-	-	-	-	-	-	-	-	-	2	1501
8	Villa Hayes	1410	3300	41	29	1.00	Not sea.	1	1	A	Priv.	1	1	-	2	30771
9	Arandubé	2532	-	-	-	-	-	-	-	-	-	-	-	-	-	2105
10	Uyapio	3070	-	-	-	-	-	-	-	-	-	-	-	-	-	2105
11	S.R. Alonso	2674	-	-	-	-	-	-	-	-	-	-	-	-	-	2419
12	Capitani	447	-	-	-	-	-	-	-	-	-	-	-	-	-	2631

LEGENDA

A : Backer Truck.

B : Open Truck.

C : Sweeper Aspirator.

D : Vacuum Collection Service.

2.3

Existing Laws and Regulation concerning SWM

Health Code

The Health Code was enacted recently (Law 836, December 15, 1980).

Title II, chapter I deals with environmental sanitation, pollution, and degradation of the environment. This law prohibits all actions that cause the degradation of the natural environment or render it as health hazard (Article 66)

Article 68 assigns the task of promoting pollution prevention and control programs to the Ministry of Health.

From the legal standpoint, the Health Code has ample provisions aimed at environmental protection and its regulation on solid waste aspects is being made right now by technicians of SENASA.

Municipal Regulation :

Legal aspects related to Urban Cleanliness:

a) Law No.222/54, Organic Municipal Law, attributes to the Municipality the power to dictate the necessary measures for cleanliness, and the collection and treatment of garbage in the area.

b) Law No.620/76, Municipal Tax Law is related to the fees for garbage collection, street sweeping and cemeteries sweeping and cleaning.

These Laws are regulated by ordinances which are the main legal instruments used to authorize municipal activities. Ordinances rank below decrees, and even farther below laws and code in the order of precedence of legal regulations.

3.

OBJETIVES OF THE STUDY

The objectives of the study are:

- 3.1 To develop a sound SWM (Solid Waste Management) technical system, regarding the collection, processing and final disposal of municipal waste in Asuncion Metropolitan Area up to the year 2006 with the aims being improvement and safeguard of public health and social welfare, increase in recovery of resources and protection of the quality of the environment.
- 3.2 To establish a Master Plan for SWM in the Metropolitan area up to the year 2006, including the development of institucional, educational and administrative structures, in addition to the above-mentioned technical system.
- 3.3 To develop a feasible implementation plan for all proposals made in the Master Plan, including an immediate, a short-term, a medium-term and a long-term SWM improvement plan, and
- 3.4 To carry out a feasibility study for the implementation of the proposed medium-term (first phase) project, so that the financial resources needed for the project implementation can be obtained from international lending agencies and/or the Government of Paraguay.

4. SCOPE OF THE STUDY

4.1 Study Area

The study shall cover the entire area under the jurisdiction of ANUAN (Association of Municipalities of the Metropolitan Area), as shown in Annex I

4.2 Study Components

The Study shall be carried out in two(2) successive stages;

- i) Master Plan Study stage
- ii) Feasibility Study stage

4.2.1 Master Plan Study

The Master Plan Study includes the following items;

- 1) Study on the Present Conditions
 - i) Data collection and analysis of natural, structural and socio-economic conditions of the study area, and of relevant projects such as those included in regional development plans, etc.
 - ii) Collection and review of data and relevant reports on the SWM which refer to solid waste discharge, storage, collection, processing, recycling, final disposal and institutional systems.
 - iii) Study on solid waste amount and composition
 - iv) Comprehension of the present SWM and identification of its problems.
- 2) Study of a Planning Framework.
 - i) Site selection for major facilities such as a composting plant, an incineration plant, a final disposal site, etc.
 - ii) Determination of goals and targets for the Master Plan.
 - iii) Examination of the preconditions for the Master Plan such as those regarding the planning period, service area, population, future solid waste amount and composition, socio-economy, service levels, etc.
 - iv) Comparative analysis of alternative future technical system components.
 - v) Selection and determination of the best alternative based on a comparative study on the combination of technical system components

3) Formulation of the Master Plan.

The Master Plan shall include the following.

- i) Solid waste generation and discharge control planning.
- ii) Collection and transportation planning.
- iii) Recycling and intermediate treatment planning.
- iv) Final disposal planning.
- v) Organization and management planning
- vi) Education and training planning
- vii) Financial planning
- viii) Identification of first priority projects
- ix) Immediate and short-term improvement planning

4.2.2 Feasibility Study

The Feasibility Study includes the following items:

- 1) Adjustment of the Planning Framework
 - i) Target year and goal
 - ii) Service area and service level
 - iii) Technical and institutional system components
 - iv) Sites for major facilities
 - v) Design criteria for equipment and facilities
- 2) Preliminary Design of Technical System Components
 - i) Investigation of sites for major facilities
 - ii) Discharge and storage systems planning

- iii) Collection and transportation systems planning
 - iv) Transfer station (s) planning (if included in the first priority project)
 - v) Processing facilities planning (if included in the first priority project)
 - vi) Final disposal site(s) planning
 - vii) Operation and maintenance planning for equipment and facilities
 - viii) Cost estimation
 - ix) Institutional development planning related to SWM
- 3) Project Implementation Plan
 - i) Implementation schedule planning
 - ii) Financial Planning
 - 4) Project Evaluation
 - i) Financial evaluation
 - ii) Evaluation of various effects (economic, environmental and social)

5. STUDY SCHEDULE

- 5.1 A period of 16 months is proposed for completion of the study. It is proposed that the Study should commence on or before December 1991 so that it can be completed on or before March 1993. The proposed timing is necessary to ensure smooth implementation.
- 5.2 A tentative study schedule for the proposed study is given in Annex IV.

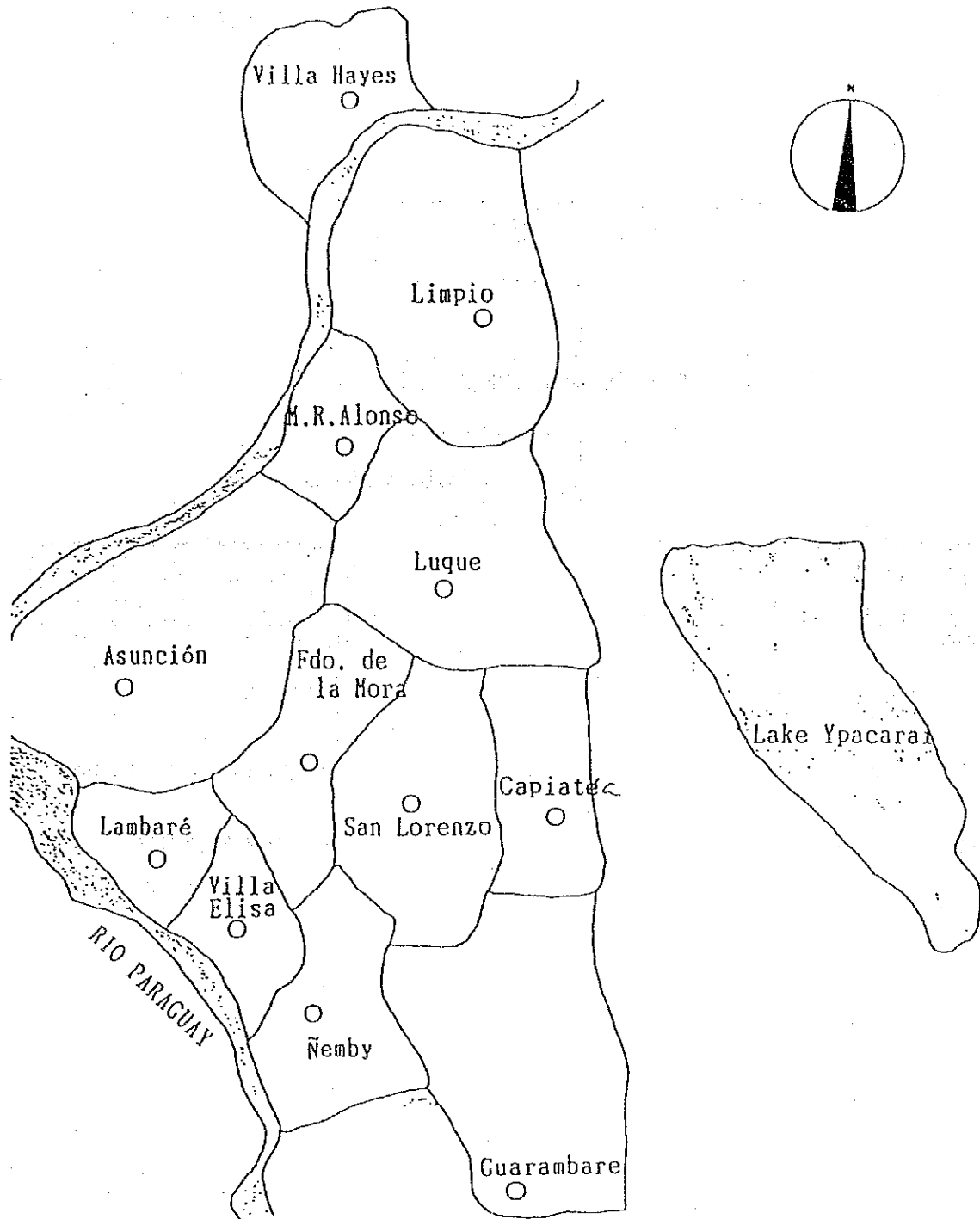
6. Reports

The following reports shall be submitted to the Government of Paraguay during the study :

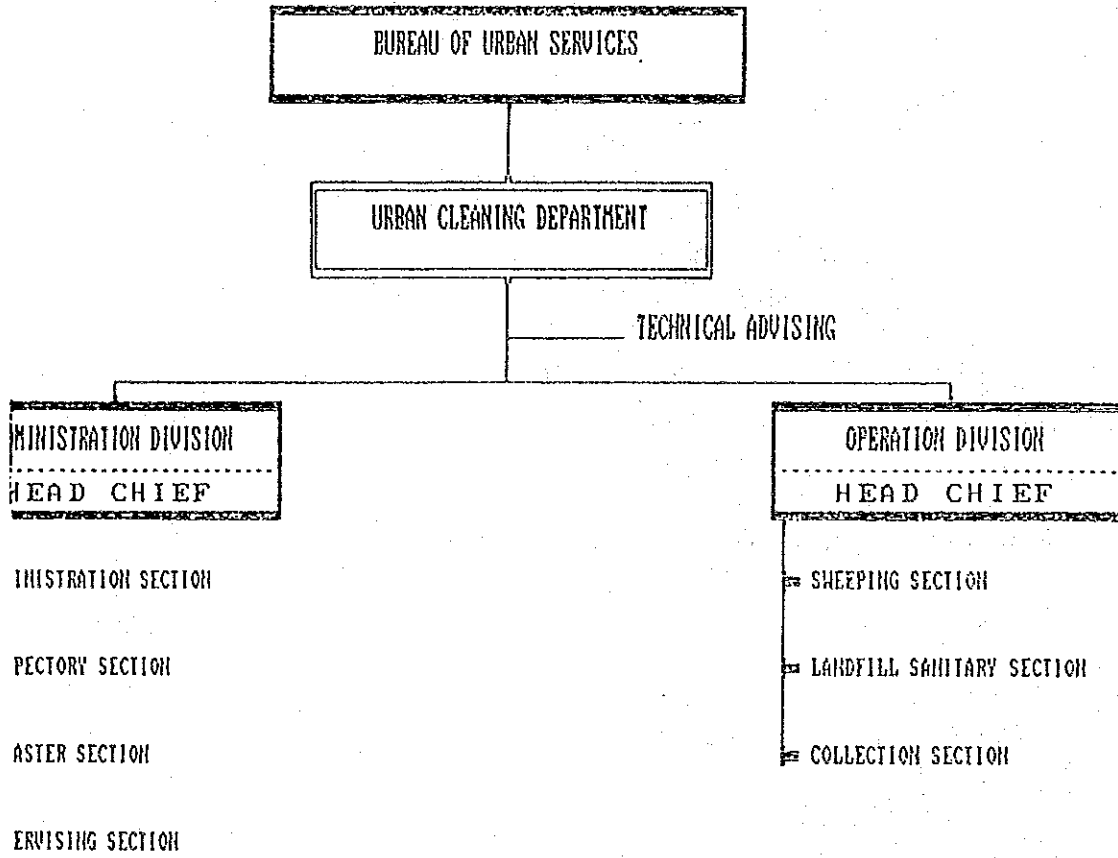
- 6.1 Inception Report..to be submitted at the beginning of the first field survey for the Master Plan Study. This report shall contain the schedule and methodology of the study as well as details on the field survey programs to be carried out by the consultant. Twenty (20) copies of this report shall be submitted.
- 6.2 Progress Report (I)....to be submitted at the end of the first field survey in Paraguay. This report shall summarize the findings of the field survey. Twenty (20) copies shall be submitted.
- 6.3 Interim Reportto be submitted at the commencement of the second field survey in Paraguay. This report shall contain all relevant details on the proposed Master Plan . The priority project shall be identified for the first phase of the proposed Master Plan. Twenty (20) copies of this report shall be submitted.
- 6.4 Progress Report (II)....to be submitted at the end of the second field survey in Paraguay. This report shall summarize the findings in the field survey carried out for the Feasibility Study. Twenty (20) copies of this report shall be submitted.
- 6.5 Draft Final Report...to be submitted at the end of the thirteenth month. This report shall outline the results of the effected study and the results of the Feasibility Study, as well as the recommendations made by the consultant. This report shall be reviewed by the Supervision and Technical Committees of the Paraguayan Government and the outcome of such reviews will be conveyed to the consultant within one (1) month from the date of receipt of the report. Twenty (20) copies of this report shall be submitted.

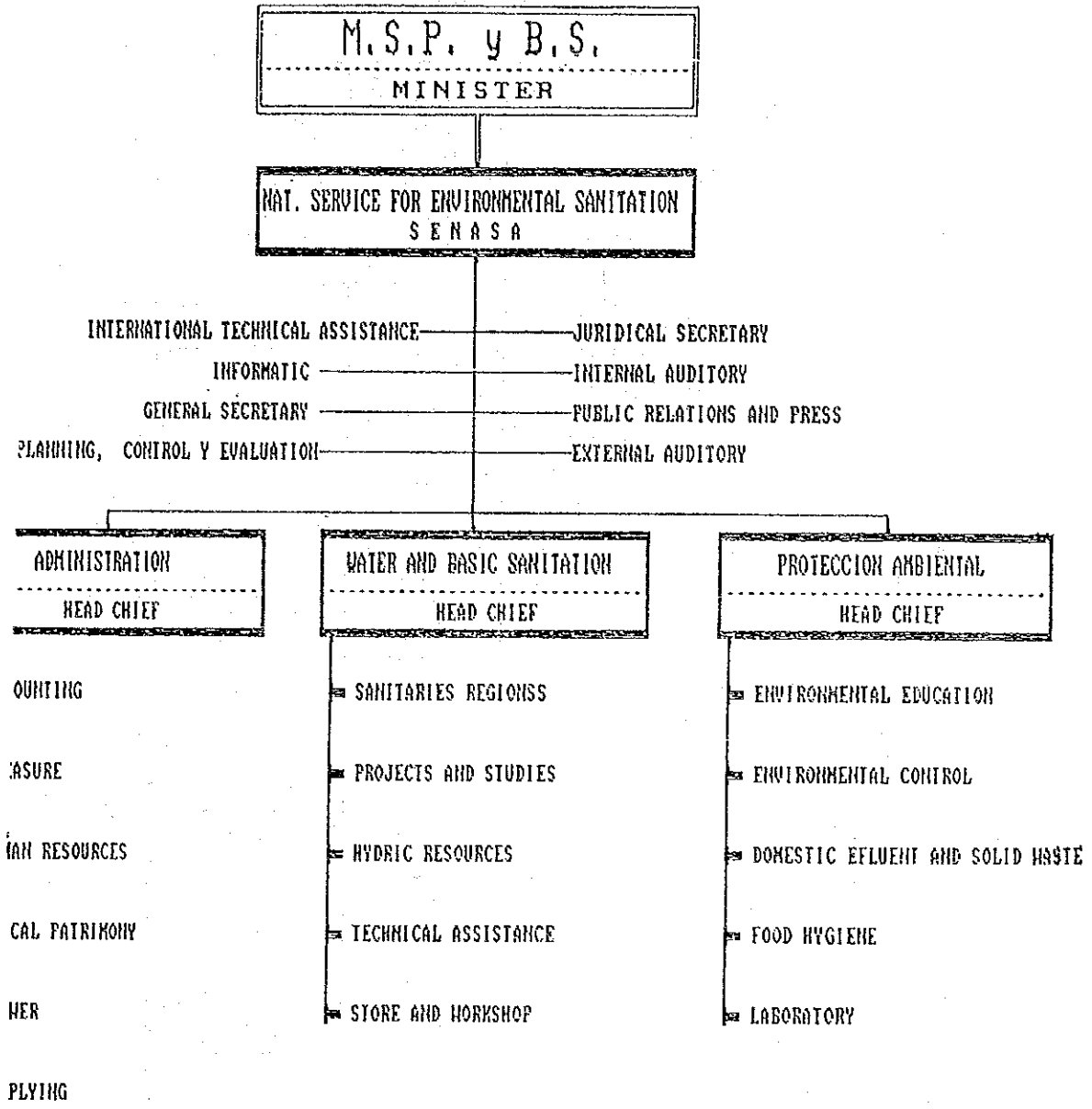
- 6.6 Final Report...to be submitted at the middle of the fifteenth (15) month. All comments and directives given by the Supervision Committee of the Paraguayan Government on the Draft Final Report shall be complied with in the preparation of the Final Report. Forty (40) copies of this report shall be submitted.
7. UNDERTAKING COORDINATION AND MONITORING
- 7.1 SENASA will be the counterpart institution of the Government of Paraguay, and shall make available to the consultant all relevant data, reports, maps and others documents which are available on the Metropolitan Area. SENASA shall set up a Technical Committee for the Study.
- 7.2 Equipment owned by SENASA and needed for the field work in the course of the Study shall also be available to the consultant
- 7.3 Local transportation within the Metropolitan Area and office space needed by the Study Team will be made available by SENASA.
8. STUDY COORDINATION AND MONITORING
- 8.1 The Government of Paraguay will establish a Supervision Committee which consists of representatives from the technical Planning Secretariat (STP), Ministry of Public Health and Social Welfare (MPSW), and Association of Municipalities of the Metropolitan Area (AMUAN). This committee will review and supervise the study activities and give general guidance to the Study Team.
- 8.2 The Government will assemble and make available to the consultant all existing relevant materials needed for the Study.
- 8.3 The Government will be represented by the Supervision and Technical committees whose members will be chosen in due course from the various concerned agencies within the Government.
- 8.4 The Supervision and Technical Committees shall meet to review the Inception Report, the Interim Report and the Draft Final Report.

As regard the two Progress Reports (I and II), only the Technical Committeem shall meet for discussion. The consultant shall present these reports to the above Committees at a meeting, in person, so that any clarifications as well as decisions required from the committees can be made in a speedy manner so as not to affect the progress of the study.




ASUNCION METROPOLITAN AREA






TENTATIVE STUDY SCHEDULE

MONTH	Mobilization	MASTER PLAN STUDY	FEASIBILITY STUDY	PRESENTATION OF REPORTS
1				
2				INCEPTION REPORT
3				
4				
5				PROGRESS REPORT (I)
6				
7				INTERIM REPORT
8				
9				
10				PROGRESS REPORT (II)
11				
12				
13				DRAFT FINAL REPORT COMMENTS
14				
15				
16				FINAL REPORT

 FIELD SURVEY AND/OR EXPLANATION OF REPORT IN PARAGUAY.

 HOME WORK IN JAPAN

附屬資料 2. Questionnaire

CUESTIONARIO

1. Favor de darnos los siguientes informes sobre el fondo del Requerimiento.
 - (1) Deficiencias del presente sistema del Manejo de Residuos Sólidos en el Area Metropolitana de Asunción. (operacional, administrativo, financiero y de planeamiento)
 - (2) Estadísticas de salud que muestran la necesidad urgente para el mejoramiento del Manejo de Residuos Sólidos en el Area Metroplolitana de Asunción.
 - (3) Daños causados por el sistema deficiente del Manejo de Residuos Sólidos de Asunción.
2. Favor de darnos los siguientes informes sobre la estructura organizacional de la parte Paraguaya para el Estudio.
 - (1) Nombres y títulos de los miembros de la Comité Directivo del Estudio.
 - (2) Nombres y títulos y especialidades de los miembros de la Contraparte.
3. Favor de aclarar el Alcance del Trabajo sobre los puntos básicos siguientes:
 - (1) Residuos Sólidos a ser cubiertos por el Estudio y su definición.
 - (2) El nivel del servicio mínimo a ser realizado para el año de meta.
 - (3) El proyecto de prioridad para el mejoramiento del Manejo de Residuos Sólidos.
4. Favor de darnos los siguientes informes básicas

para el estudio

- (1) Estadísticas de la población y la estimación para el futuro. Especialmente, la proyección oficial de la población del Area Metropolitana de Asunción que se usa en el estudio.
- (2) Planes de desarrollo a ser usados como las bases para el estudio.
- (3) El uso actual del terreno y planes del uso de terreno en el futuro para el Area Metropolitana de Asunción.
- (4) Lista de todos los planes y estudios, anteriores y actuales sobre el Manejo de Residuos Sólidos en el Area Metropolitana de Asunción.
- (5) Datos sobre las actividades de cooperación implementadas y a ser implementadas por las otras agencias de cooperación bilateral o multilateral relacionada al proyecto requerido.

5. Favor de aclarar el plan nacional y la política del Manejo de Residuos Sólidos incluyendo los siguiente informes

- (1) Políticas, programas y proyectos del Manejo de Residuos Sólidos
- (2) Instituciones relacionadas al Manejo de Residuos Sólidos del nivel nacional, organizaciones, presupuesto y las actividades.
- (3) Leyes, regulamentos, normas y guías relacionados al Manejo de Residuos Sólidos. El Código Sanitario.
- (4) Regulamentos y guías de Evaluación del Impacto Ambiental especialmente para proyectos de rellenos, facilidades intermedias.

- (5) Plan de inversión para el sector y el criterio de planeamiento.
 - (6) Programa de desarrollo de recursos humanos para el sector.
 - (7) Educación de salud pública y programa de la participación comunitaria.
 - (8) Investigación y desarrollo de tecnologías adecuadas para el Manejo de Residuos Sólidos.
6. Favor de darnos los siguientes informes sobre el presente sistema del Manejo de Residuos Sólidos en el Area Metropolitana de Asunción.
- (1) El rol de la Asociación de Municipalidades del Area Metropolitana (AMUAN) y la relación entre AMUAN y Municipalidades.
 - (2) Reglas y reglamentos del Manejo de Residuos Sólidos de Municipalidad.
 - (3) El rol de recolectores privados y la política de privatización.

Asuntos Básicos Para Estudios sobre Gerenciamiento de Residuos Sólidos
en Area Metropolitana de Asunción

Este cuestionario ha sido preparado para cada Municipal dentro del Area Metropolitana de Asunción. Las informaciones acerca de Asuntos Básicos descritos aquí en adelante son necesarias para Estudios sobre Gerenciamiento de Residuos Sólidos.

1. Nombre de Ciudad :

Año '90

Año '91

Año '92

Población :

Número de Familia :

2. Generación de Residuos Sólidos

(1) Residuos Sólidos desde (o por)

valor al medio

Unidad: ton/día o (m³/día)

Año '90

Año '91

Año '92

- (a) Casas : .
- (b) Oficinas : .
- (c) Industrias : .
- (d) Sitios de Construcción : .
- (e) Mercados : .
- (f) Areas Comerciales : .
- (g) Hospitales : .
- (h) Calle-Barridos : .
- (i) Areas de Hierba : .

¿ Cuántas veces se recolectan por semana acerca de cada asunto ?

(2) Cantidad de Generación de Residuos Sólidos mencionado arriba, coda uno :

(i) Frecuencia de Recolección por semana

	<u>Año '91 (ton/día)</u>	<u>Año '92 (ton/día)</u>
	Max/Medio/Min	Max/Medio/Min

Cantidad de Generación por semana :

¿ Qué día en semana ?

(ii) Cantidad de Generación de cado mes

	Jan	Feb	Mar	Abr	May	Jun	Jul	Ago	Sept	Oct	Nov	Dic
--	-----	-----	-----	-----	-----	-----	-----	-----	------	-----	-----	-----

Año '91 (ton/mes) :

Año '92 (ton/mes) : -

(3) Características de Residuos Sólidos, valor al medio

(a) Composiciones Físicas

(i) Combustibles : %

(ii) Agua : %

(iii) Incombustibles : %

(b) Valor calorífico (valor bajo) :

(c) Composiciones Químicas :

(d) Peso Específico :

(e) Otras características, si algas :

Kcal/kg

kg/m³

3. Organización para Gerenciamiento de Residuos Sólidos

(1) Nombre de Organización :

(2) Números de Personales : Personales en Oficina :

Mecánicos :

Choferes :

Obreros :

(3) Números de Personales : Personales en Oficina :

Mecánicos :

Chóferes :

Obreros :

(4) Presupuesto : para Organización propia

para Compañía Privada, si alguna :

4. Vehículos y Equipos Especiales existentes para Recolección

(1) Cantidad	en servicio		fuera de servicio	
	m ³ /cam X	unid	m ³ /cam X	unid
(a) Camiones Compactadoras :	id X	id	id X	id
(b) Camiones de Volteo :	id X	id	id X	id
(c) Camiones Ordinarios :	id X	id	id X	id
(d) Buldozer :				
(e) Barredoras Mecánicas :				
(f) Otros Equipos Especiales :	m ³ /unidX	unid	m ³ /unidX	unid

(2) Especificaciones sobre cada Equipo mencionado arriba :

(i) País de Origen :

(ii) Modelo :

(iii) Fecha de Manufactura

(iv) Razón porque está fuera de servicio, si así es.

(3) Taller de Mantenimiento y/o Reparación para estos vehículos y equipos :

(a) ¿ Como están las condiciones presentes y la capacidad de mantenimiento ?

(b) ¿ Cuantos camiones y equipos son reparado por mes usualmente ?

5. Proyecto Relacionado

Si hay algunos proyectos relacionados con Gerenciamientos de Residuos Sólidos,

haga el favor de describir el contorno que será útil para los estudios :

(1)

(2)

6. Situación Presente sobre recolección de Residuos Sólidos

- (1) Area de Colección : (km)²
- (2) Calles (i) Calles pavimentadas : km
(ii) Calles no pavimentadas : km
Cubierta de Residuos Sólidos es en : % , % vol
- (3) Distancia promedio de Transportación : km
(desde los puntos de recolección al Sitio de Disposición Final)
- (4) Horas de Obras para recolección : h/s/día trabajo
- Días de no-trabajo (i) en semana :
(ii) total por año :
- (5) Metodo de almacenamiento : por volsa vinilica y plástica de
(en las lugares de recolección) : por contenedor de
: por otros de
lval
lval
lval
- (6) Arrojo ilegal (i) Cuantos lugares :
(ii) en que lugar :
(iii) Cómo se los tratan :

7. Situación Presente sobre Sistema de Recuperación de Recursos

(1) Recuperación de Recursos desde Residuos Sólidos : kg/día al medio

- (a) Botellas del vidrio :
- (b) Latas del acero :
- (c) Latas del aluminio :
- (d) Cartones del papel :
- (e) Papeles periódicos :
- (f) Plásticos :

(2) ¿ De dónde (o Cuanto) se recuperan ?

- (a) antes de descarga.
- (b) después de descarga (durante recolección)
 - (i) en los lugares temporarios.
 - (ii) en Sitios de Disposición Final.

(3) Método de tratar Recursos :

- (a) Manera
- (b) Ruta
- (c) Suma del ingreso

8. Problemas Pendientes sobre recolección de Residuos Sólidos, si hay algunos :

9. Información Adicionales :

- (1) Si algunas datas y/o algunas informaciones alrededor de los puntos desde 1 a 8 mencionados arriba, haga el favor de avisarlos a nuestra delegación.
- (2) Nos hace un favor de saber Nombre, Tel No y Direccion de la(s) person(as) quien(es) ha(n) escrito las respuestas y las informaciones acerca de los puntos.

Sitios de Disposición Final para Residuos Sólidos en Area Metropolitana de Asunción

Este cuestionario ha sido preparado para cada sitio de Disposición Final de alguna(s) Municipal(es) en Area Metropolitana de Asunción. Las informaciones y los datos acerca de Sitios de Disposición Final descritos aquí en adelante son muy esenciales para Estudios Sistemáticos sobre Sitios de Disposición Final.

1. Nombre de Sitio :

Dirección :

Ciudad :

2. Condiciones de Dirección, Area y Capacidad :

(1) Altura desde la superficie cercana :

(2) Area : m²

m alto or bajo

m³

Capacidad :

Capacidad restante : m³

Año ; , Mes : , Día :

(3) Fecha del comienzo de Uso :

(4) ¿ Qué es el nombre de Ciudad, si es usado también por otra ciudad ?

3. Condiciones del área cercana :

(1) Utilización de las áreas cercanas :

(2) Habitantes alrededor de Sitio de Disposición Final :

(3) Mapa de Carrteras de las áreas cercanas :

(4) Características de Topografía y Geografía :

4. Condiciones Ambientales.

- (1) Situación de Aguas percoladas
- (2) ¿ Hay Residuos de regueño-tamaño dispersando ?
- (3) ¿ Hay mal olor ?
- (4) las moscas o otros insectos

5. Situación de Recuperación de Recursos.

- (1) Tipos de Recursos :
- (2) Número de segregadores

6. Método de Disposición Final.

- (1) Tipos de Equipos Usados :
- (2) Número de Obreros :
- (3) Focilidades :

7. Planes de Sitios de Disposición Final.

- (1) Plan para usar el área recuperada :
- (2) Plan Nuevo para construir y mantener Sitios de Disposición Final :

8. Costos de Construcción y Leyes :

- (1) Costos de Construcción :
- (2) Costos de Mantenimiento :
- (3) Leyes, Regulaciones y Códigos.

9. Gerenciamient sobre Sitios de Disposición Final.

- (1) Gerenciamiento, Organización y las personas (en Oficina y en Sitio) :
- (2) Costos y Gostos :
- (3) ¿ Cuantas camiones vienen al Sitio por día ?

10. Situación de Disponibilidad de Tierra para cubrir :

11. Perspectiva de disponibilidad a largo plazo de Sitios de Disposición Final :

12. Problemas pendientes y Problemas previsto :

13. Informaciones Adicionales :

- (1) Si hay algunos datos en detalles y/o informaciones alrededor de los puntos mencionados arriba, haga el favor de avisarlas a nuestra delegación.
- (2) Haga el favor de escribir Nombre, Tel No. y Dirección de la(s) persona(s) quien(es) ha(n) escrito las respuestas y las informaciones sobre los puntos arriba mencionados.

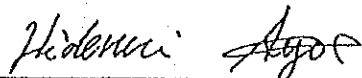
附屬資料 3. Scope of Work

SCOPE OF WORK
FOR
THE STUDY
ON
THE SOLID WASTE MANAGEMENT
FOR
METROPOLITAN AREA OF ASUNCION
IN
THE REPUBLIC OF PARAGUAY

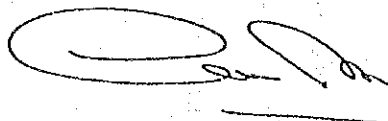
AGREED UPON BETWEEN

THE MINISTRY OF PUBLIC HEALTH AND SOCIAL WELFARE
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

ASUNCION, 27th., JAN. 1993



DR. HIDENORI AYA
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY



DRA. CYNTHIA PRIETO CONTI
MINISTRA
MINISTERIO DE SALUD PUBLICA
Y BIENESTAR SOCIAL

I .INTRODUCTION

In response to the request of the Government of the Republic of Paraguay (hereinafter referred to as the Government of Paraguay), the Government of Japan has decided to conduct the Study on the Solid Waste Management for Metropolitan Area of Asuncion in the Republic of Paraguay (hereinafter referred to as the "Study") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Paraguay.

Accordingly, the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation programmes of the Government of Japan, will undertake the Study, in close cooperation with the authorities concerned of the Government of Paraguay.

The present document sets forth the scope of work with regard to the Study.

II .OBJECTIVE OF THE STUDY

The objectives of the Study are:

1. to formulate a master plan for the improvement of the Solid Waste Management (hereinafter referred to as "SWM") of the Asuncion Metropolitan Area up to the target year of 2006.
2. to conduct a feasibility study for the first priority project based on the master plan.

III .STUDY AREA

The Study will cover the whole area under the jurisdiction of Association of Municipalities of the Asuncion Metropolitan Area.

IV .SCOPE OF THE STUDY

In order to achieve the above objectives, the Study will cover the followings:

1. Basic Study
 - (1) Collection and review of existing data and information on:
 - a. Physical conditions such as climate, topography, geology, etc.
 - b. National policies and development plans related to SWM
 - c. Social and economic conditions and statistics
 - d. Urban development plan and land use
 - e. Road traffic system

Age 2

- f. Legislation and institutional aspects on SWM
- g. Financial condition of the Municipalities
- h. Present condition of SWM
 - Discharge
 - Collection
 - Transfer
 - Transportation
 - Treatment
 - Disposal
 - Street sweeping
 - Composting
 - Resource recovery
 - Administration
 - Institution
 - Legal aspects
 - Finance
- i. Review of on-going projects related to SWM
- j. Social and environmental impact of the solid waste problem

(2) Field survey

- a. Amount of solid waste and its composition
- b. Geology, water quality, land use in existing dumping area and future landfill sites
- c. Public consciousness on SWM
- d. Environmental survey

2. Analysis of collected data

3. Identification and analysis of the problems

4. Forecast of future amount and characteristics of solid waste

5. Formulation of the master plan on SWM

(1) Confirmation of planning framework for the formulation of the master plan

- a. Target year
- b. Planning area
- c. Service level
- d. System components

(2) Preparation of alternatives for future system components

(3) Evaluation of alternatives from the viewpoint of public health, technology, economy, society, institution and finance

(4) Conduct of initial environmental examination

(5) Selection of the best alternative and formulation of the master plan

(6) Implementation schedule of the master plan

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- (7) Identification of the priority project
6. Feasibility study on the priority project
 - (1) Confirmation of the planning framework
 - a. Target year
 - b. Planning area
 - c. Service level
 - d. System components
 - (2) Supplemental basic study
 - (3) Technical examination of system components
 - (4) Preliminary design of facilities
 - (5) Identification of necessary equipments
 - (6) Planning of operation and maintenance
 - (7) Consideration of institutional and organizational development
 - (8) Cost estimation
 - (9) Environmental impact assessment, if necessary
 - (10) Project evaluation
 - a. socio-economic aspects
 - b. financial aspects
 - c. environmental aspects
 - (11) Project implementation plan

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V . SCHEDULE OF THE STUDY

The Study, will be carried out in accordance with the tentative schedule attached in the ANNEX.

VI . REPORTS

JICA will prepare and submit the following reports in ENGLISH to the Government of Paraguay.

1. Inception Report;
Twenty (20) copies at the beginning of the first work in Paraguay.
2. Progress Report (1) ;
Twenty (20) copies at the end of the first work in Paraguay.
3. Interim Report;
Twenty (20) copies at the beginning of the second work in Paraguay.
4. Progress Report (1) ;
Twenty (20) copies at the end of the second work in Paraguay.
5. Draft Final Report;
Twenty (20) copies at the beginning of the third work in Paraguay.
The Government of Paraguay will submit its comments within one (1) month after the reception of the Draft Final Report.
6. Final Report;
Forty (40) copies within two (2) months after the reception of the comments on the Draft Final Report.

VII . UNDERTAKINGS OF THE GOVERNMENT OF PARAGUAY

The Government of Paraguay shall accord privileges, immunities and other benefits to the Japanese Study Team (hereinafter referred to as "the Team") in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Paraguay.

1. To facilitate the smooth conduct of the Study, the Government of Paraguay shall take necessary measures:

- (1) to secure the safety of the Japanese Study Team
- (2) to permit the members of the Team to enter, leave and sojourn in Paraguay for the duration of their assignment

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therein, and exempt them from foreign registration requirements and consular fees;

- (3) to exempt the members of the Team from taxes, duties and other charges on equipment, machinery and other materials brought into Paraguay for the conduct of the Study;
 - (4) to exempt the members of the Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Team for their services in connection with the implementation of the Study;
 - (5) to provide necessary facilities to the Team or remittance as well as utilization of the funds introduced into Paraguay from Japan in connection with the implementation of the Study;
 - (6) to secure permission for entry into private properties or restricted area for the conduct of the Study;
 - (7) to secure permission for the Team to take all data and documents (including photographs) related to the Study out of Paraguay to Japan;
 - (8) to provide medical services as needed. Their expenses will be chargeable on members of the Team.
2. The Government of Paraguay shall bear claims, if any arises, against the members of the Team resulting from, occurring in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Team.
 3. The Ministry of Public Health and Social Welfare, National Service of Environmental Sanitation (hereinafter referred to as "SENASA") shall act as counterpart agency to the Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth and appropriate implementation of the Study.
 4. SENASA shall, at their own expense, provide the Team with the following items, in cooperation with relevant organizations, if necessary.
 - (1) available data and information related to the Study
 - (2) counterpart personnel
 - (3) suitable office space with necessary equipments and furnitures

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(4) credential or identification cards

(5) appropriate number of vehicles with drivers

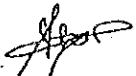

VII .UNDERTAKING OF JICA

For the implementation of the Study, JICA will take the following measures:

- 1.To dispatch, at its own expense, the Team to Paraguay;
- 2.To pursue technology transfer to the Paraguay counterpart personnel in the course of the Study.

IX .CONSULTATION

JICA and SENASA shall consult each other in respect of any matter that may arise from or in connection with the Study.



TENTATIVE STUDY SCHEDULE

ANNEX

DESCRIPTION	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
WORK IN PARAGUAY																
WORK IN JAPAN																
REPORT PRESENTATION	▲ IC/R			▲ P/R (1)	▲ IT/R			▲ P/R (2)	▲ DF/R					▲ F/R		
Report	IC/R: Inception Report				IT/R: Interim Report				F/R: Final							
	P/R : Progress Report				DF/R: Draft Final Report											

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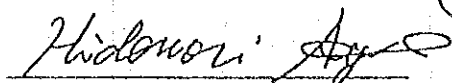
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附屬資料 4. Minutes of Meeting

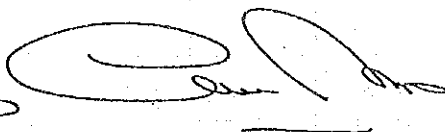
MINUTES OF MEETING
FOR
THE STUDY
ON
THE SOLID WASTE MANAGEMENT
FOR
METROPOLITAN AREA OF ASUNCION

JANUARY 27th., 1993

ASUNCION, PARAGUAY



DR. HIDENORI AYA
LEADER
PREPARATORY STUDY TEAM
JAPAN INTERNATIONAL
COOPERATION AGENCY



DRA. CYNTHIA PRIETO CONTI
MINISTRA
MINISTERIO DE SALUD PUBLICA
Y BIENESTAR SOCIAL

In response to the request of the Government of the Republic of Paraguay (hereinafter referred to as "the Government of Paraguay"), the Japanese Preparatory Study Team (hereinafter referred to as "the Team") was sent by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), to discuss with The Ministry of Public Health and Social Welfare, National Service for Environmental Sanitation, (hereinafter referred to as "SENASA",) the Scope of Work for the Study on the Solid Waste Management in Metropolitan Area of Asuncion. (hereinafter referred to as "the Study") All the members of the Team headed by Dr.Hidenori Aya arrived at Paraguay on the 20th of January, 1993. During their stay in Paraguay, the Team carried out field reconnaissance in the Study Area, received available information and held a series of interviews with officials of central and local governments.

The Team also had discussions with SENASA on the Scope of Work to be undertaken by both SENASA and JICA for the successful execution of the Study. A list of those who attended these meetings-is shown in the Annex 1.

The main items which were discussed by the Team and SENASA are as follows:

1. The Team proposed a draft Scope of Work, which was discussed in detail and agreed between the Team and SENASA with some modifications.
2. The Study Area consists of the whole area under the jurisdiction of the Metropolitan Area of Asuncion, however limited to the urbanized areas of municipalities. This Study Area is shown in the Annex 2.

3. The type of solid wastes to be studied is mainly limited to municipal solid waste. It includes household waste, market waste, office and commercial waste, and street sweeping waste. Non-hazardous industrial waste will be assessed and evaluated in the Study.
4. Medical waste, agricultural waste and animal husbandry waste are excluded from the Study. However, medical waste, after appropriate treatment, will be included.
5. The identification of future sanitary landfill site(s) shall be completed by SENASA by the time of submission of the Progress Report (I).
6. The plan of collection area shall be determined according to the Master Plan of city planning for the Metropolitan Area.
7. JICA Study Team shall assess the environmental impact to be caused by waste management facilities in compliance with the policy and legislations set by the Government of Paraguay.
Environmental evaluation stated in IV 6.(9) in the Scope of Work shall cover the technical aspects of water pollution, as the results of discussion with SENASA.
8. JICA Study Team shall prepare main reports of the Draft Final and Final Report in Spanish as a reference according to the request of SENASA. In addition, JICA Study Team shall prepare a brief summary in Spanish for each of all other reports to facilitate the discussion between JICA Study Team and SENASA.
9. To guarantee smooth conduct of the Study and promote technology transfer through on-the-job training, SENASA shall designate the following counterparts:

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- (1) A counterpart to JICA Study Team Leader
(part time)
- (2) Two officers (full time)
- (3) Other officers (ad-hoc basis)

10. SENASA explained to the Team to prepare on its own responsibility the following organizations to guarantee the efficient and effective conduct of the Study:

- (1) Supervision Committee consist of the representatives of Ministry of Public Health and Social Welfare, Association of Municipalities of the Metropolitan Area, Technical Planning Secretariat and Institute of Municipal Development.
- (2) Technical Committee consist of technical staff of SENASA and Association of Municipalities of the Metropolitan Area.

11. To pursue technology transfer as stated in W.2 in the Scope of Work, SENASA requested JICA to hold a seminar in conjunction with the submission of the Draft Final Report. SENASA also requested JICA to train some Paraguayan counterpart personnel in Japan.

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- Annex 1. List of the Attendants
 - Annex 2. Map of the Study Area

LIST OF ATTENDANTS

Paraguayan Side

Eng. Eulize ZUGASTI	Director National Service for Environ- mental Sanitation (SENASA)
Eng. Sebastian JARA	Chief Environmental Protection Dept.
Eng. Roberto LIMA	Staff Environmental Protection Dept.
Eng. Fernando GONZALEZ	Staff Environmental Protection Dept.

Japanese Side

Dr. Hidenori AYA (LEADER)	Professor, Department of Civil Engineering, Musashi Institute of Technology
Mr. Koji KUNO (SOLID WASTE MANAGEMENT)	Assistant Advisor, Industrial Waste Management Guidance Div. Waste Management Dept., Waste Management Bureau, City of Chiba
Mr. Yoshihiro NISHIMURA (STUDY PLANNING)	Staff, Second Social Development Study Div. Social Development Study Dept. Japan International Cooperation Agency
Mr. Tokuyuki KIMURA (RELATED FACILITIES PLANNING)	Mechanical Engineer, Environmental Technologic Consultant Co., Ltd.
Mr. Masanori ITO (ENVIRONMENTAL CONSIDERATION)	Environmental Technologic Consultant Co., Ltd.

Ms. Sachiyo SAKURAI
(INTERPRETER)

International Cooperation Service
Center.

Mr. Seiki UEHARA

Resident Representative of JICA
in Paraguay

Mr. Kaichiro SHIMIZU

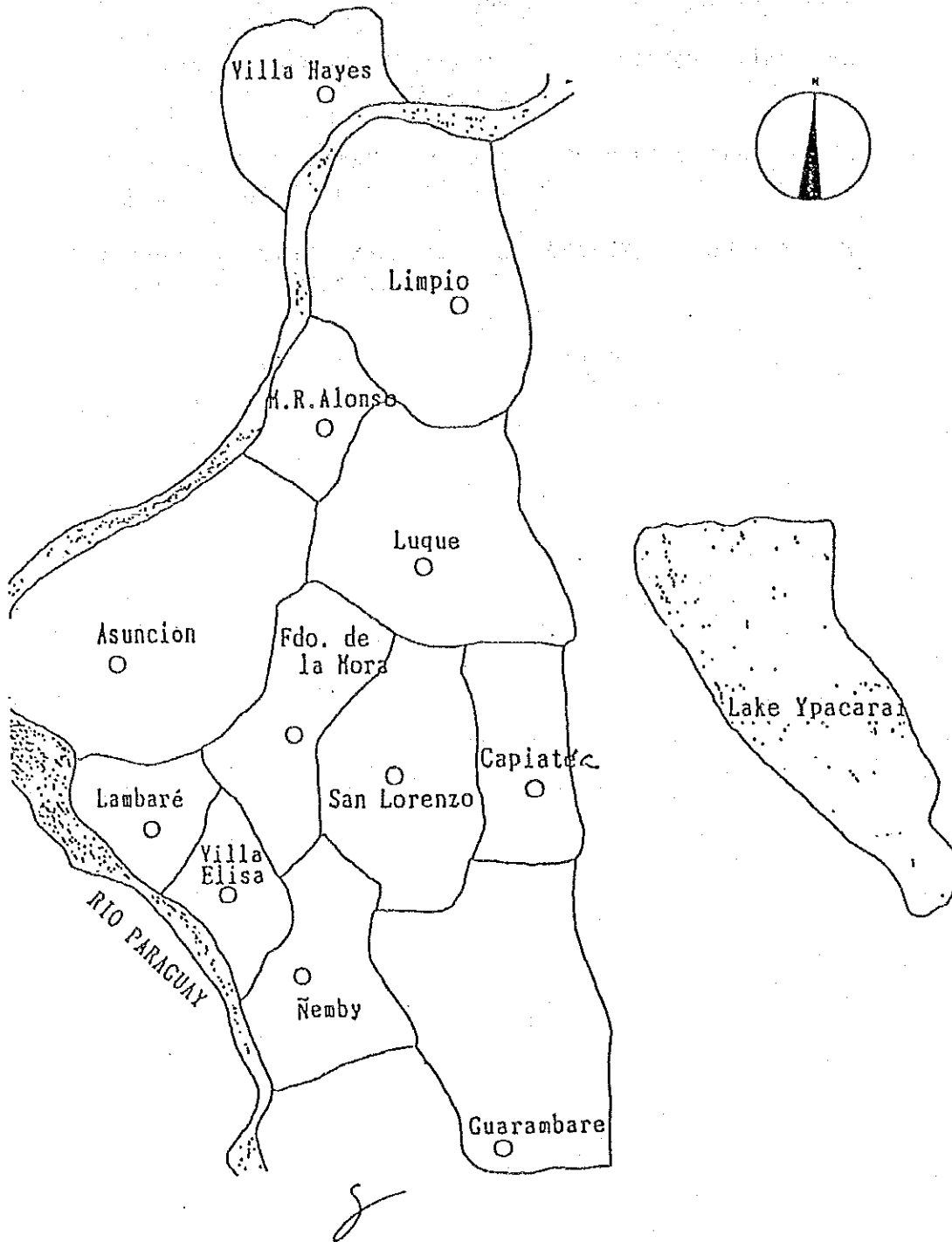
Director DPTO. Cooperation
Tecnica of JICA in Paraguay

Mr. Kozaburo YONEZAWA

Sub-Director DPTO. Cooperation
Tecnica of JICA in Paraguay

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ASUNCION METROPOLITAN AREA

附属資料 5. 主要面談者リスト

(日本側関係者)

1) JICAパラグアイ事務所

上原盛毅	JICAパラグアイ事務所 所長
清水嘉一郎	同 業務第二課長
米沢耕三郎	同 業務第二課長代理

2) 在パラグアイ日本大使館

白川臨時代理大使	在パラグアイ日本大使館
宮川二等書記官	同 上

3) JICA派遣専門家

小川修一	JICA専門家(アスンシオン市役所環境局都市清掃部)
------	----------------------------

(パラグアイ側関係者)

1) パラグアイ国厚生省

CYNTHIA PRIETO CONTI	パラグアイ国 厚生大臣
EULIZE ZUGASTI	厚生省 国家環境衛生局 (SENASA) 局長
SEBASTIAN JARA	同 上
ROBERTO LIMA	同 上
FERNANDO GONZALEZ	同 上

2) アスンシオン市役所

CARLOS FILIZZOLA	アスンシオン市 市長
CARLOS A. GALARZA JARA	アスンシオン市役所環境局 局長

3) アスンシオン首都圏市町村協会 (AMUAM) 関係者

DOUGLAS QNETO BONZI	フェルナンド・デ・ラモラ市 環境部
ARQ NURIMOR ARCE	フェルナンド・デ・ラモラ市 公共事業部
OSVALDO FERRAS	サン・ロレソン市 市長
VINCENTE CACERES	ルケ市 市長
RUBEN INOLA	ランバレ市 環境部長
MAXIMO ROMERO R.	ミエンブ市 公共事業部長
CIVIL ENRIQUE H. DELVALLE	ミエンブ市 市長
PEDRO FRETES	ビジャエリサ市 市長

附属資料 6. 収集資料及びローカルコンサルタント・リスト

1. カウンターパート (SENASA) の位置付け

- 1-1 厚生省組織図
- 1-2 SENASA組織図
- 1-3 アスンシオン市組織図
- 1-4 アスンシオン市環境局組織図

2. アスンシオン首都圏の地理・気候・人口等

- 2-1 首都圏の地図 (1:50,000)
- 2-2 首都圏の地質図
- 2-3 首都圏各都市の配置略図
- 2-4 カテラウ地区の地図 (1:2,000) (SENASA作成)
- 2-5 年間降雨量 (気象・水道局発行)
- 2-6 気温・湿度・降雨量、JICA調査図表 (CIHMA作成)
- 2-7 パラグァイ川水位 (1983~1992) (全国航行・港湾管理局発行)
- 2-8 人口、住居国勢調査 (1992)

3. 廃棄物等に関する法律・規制等

- 3-1 衛生法規 No.836
- 3-2 廃棄物処理に関する規則 (SENASA作成の素案)
- 3-3 排水基準 (SENASA作成)
- 参 考 カウンターパート (SENASA) の業務に関する法律等
- 3-4 法律 No.369、規制 No.8910

(注) 廃棄物の回収・処理等に関すると思われる法律 No.222、No.620は今回入手できなかった。

4. 廃棄物に関する資料 (含む調査)

- 4-1 W.H.O. 資料 ① ② ③ ④
- 4-2 アスンシオン市の都市清掃サービスの現状、技術調査
- 4-3 都市処分場の候補地に関する見解 (SENASA作成)
- 4-4 首都圏各市の廃棄物処理に関する質問状の回答 (9市からの回答)
- 4-5 人口及び廃棄物の推定 (首都圏の人口を '93 100万人としての将来の予測)
(SENASA作成)

- 4-6 アスンシオン市固形廃棄物処理への提言
- 4-7 ランパレ市 リサイクル・プロジェクト
- 4-8 首都圏10年後のごみ予測と衛生埋立てスペース (SENASA作成)

5. 各種プライスリスト

- 5-1 工業材料単価表 (パラグァイ国内)
- 5-2 廃棄物処理用特殊車輛
- 5-3 回収有価物の買収価格及び回収従事企業
- 5-4 労働者最低賃金表 (議決 No.415 労働協会作成)

6. その他関連資料

- 6-1 パラグァイ国厚生省の宣伝パンフレット
 - 6-2 パラグァイ国経済資料
 - (1) GNP (1982~1992)
 - (2) 輸出入額 (1970~1991)
 - (3) グァラニ対ドルレート (1981~1991)
 - (4) 外貨保有量 (1990~1992)
 - (5) 一人当たりの国民所得 (1987~1992)
 - (6) 経済概略パンフレット
- (パラグァイ国中央銀行発行)
- 6-3 アスンシオン市にかかわる資料
 - (1) 1982~1992 収支データ
 - (2) 1991/10~1992/9 清掃サービスコスト
 - (3) アスンシオン開発計画
 - (4) アスンシオン市、1年後 (広報誌)
 - (5) アスンシオン市 1992年度予算

7. 入手可能資料

	<u>入手先</u>
最終処分地図面	SENASA
水質データ	SENASA
気象データ	Dirección Nacional de Aeronáutica civil Durección de Meteorología e Hidrología Departamento de Climatología

地 図	Dirección del Servicios Geográfico Militar
法 令	SENASA
パラグアイ川水位等	Administración Nacional de Navegación y Puertos
人口統計	PRESIDENCIA DE LA REPUBLICA SECRETARIA TECNICA DE PLANIFICACION DIRECCION GENERAL DE ESTADISTICA, ENCUESTAS Y CENSOS

8. 本格調査団で必要とされる調査に関連する情報

8-1 現地コンサルタント会社情報

8-1-1 Consultores en Ingeniería Civil, Hidráulica y Medio Ambiente Avda.

Sacramento 420 Asunción, Paraguay

Tel (0059521) 604558 Fax (0059521) 660338

土木、水質、環境のコンサルタントである。

8-1-2 Juan Manual Ortellado,

Senador Long 639 Tel 609-061

8-1-3 GILDA TORRES (女性)

アスンシオン大学卒、土木技師、アスンシオンに在住しており、過去に JICA 調査団に雇用され、一時期、働いた経験あり。

廃棄物関係の現地事情に明るく、英語もできることから、利用価値はあろう。

8-2 現地ボーリング・測量・水質調査会社情報

8-2-1 ボーリング:

・ LOGOS S.R.L.

MANUEL ORTIZ GUERRERO No. 843 Tel 443805

8-2-2 測量:

・ Roberto Burgos Cardozo, PM No. 8502 R.U.C. Tel 505-411

・ Ing. Prof. Gladys Orrego, Caballero 156, Limpio Tel 0297-392

・ Ricardo Cudas Riera

・ Ing. José T. Villarejo, AV. Rui Diaz de Melgarejo 747 Tel 602-690

8-2-3 水質・ごみ質:

INYMA CONSULT S.R.L.

Avda. Brasilia 904 Tel 203-461

8-2-4 JICA 供与・水質分析関連機器 パッキング・リスト

8-3 現地トラックスケール販売会社情報

・INGENIERIA TECNICA

Dr. Morquio No.693 Tel 27662 Fax 27662

・上記は唯一の国産メーカーであるが、米国製品の代理店もある由。

JICA

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