Secretaría de Estado en el Despacho de Salud
Republic of Honduras

PREPARATORY SURVEY
FOR
THE PROJECT FOR IMPROVEMENT OF INFECTIOUS WASTE MANAGEMENT IN HONDURAS

FINAL REPORT

MARCH 2023

JAPAN INTERNATIONAL COOPERATION AGENCY

CTI ENGINEERING INTERNATIONAL CO., LTD.
KOKUSAI KOGYO CO., LTD.
EX RESEARCH INSTITUTE LTD.

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All Honduras Lempira (HNL) amounts including project costs shown in this report are stated in 2022 prices unless otherwise indicated. The amounts are estimated on the basis of foreign prices by applying the interbank currency exchange rates of the average of October 2022, namely;

USD 1 = HNL 24.67 =JPY 147.01

PREFACE

Japan International Cooperation Agency (JICA) decided to conduct the preparatory survey and entrust the survey to CTI Engineering International Co., Ltd., Kokusai Kogyo Co., Ltd., and EX Research Institute Ltd.

The survey team held a series of discussions with the officials concerned of the Government of Honduras and conducted a field investigation. As a result of further studies in Japan, the present report was finalized.

I hope that this report will contribute to the promotion of the project and the enhancement of friendly relations between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned of the Government of Honduras for their close cooperation extended to the survey team.

March 2023

Takahiro Morita
Director General
Global Environment Department
Japan International Cooperation Agency

SUMMARY

1. Outline of Honduras

The Republic of Honduras (hereinafter referred to as "Honduras") is located in the central part of Central America with a land area of 112,490 km^2 (about one-third the size of Japan), bordered by Guatemala to the west, El Salvador to the southwest, Nicaragua to the southeast, the Caribbean Sea to the north, and the Pacific Ocean to the south via the Gulf of Fonseca. The climate of Honduras is tropical in the coastal lowlands and temperate in the central highlands. There are rainy and dry seasons, with the dry season (summer) from November to April and the rainy season (winter) from May to October.

The total population has been increasing every year in the last 10 years (2012-2021), reaching 10 million in 2021 (World Bank). The real GDP growth rate of Honduras remained at the 2-4% level from 2012 to 2019, and except for 2020 (-9%), the economy continues to grow at the 12% level in 2021.

Politically, the presidential election was held in November 2021, and the opposition coalition of the Libre Party and the Honduras Salvation Party won against the ruling National Party, and candidate Castro (Libre Party) was sworn in as the new president in January 2022.

2. Background of the Project

In Honduras, infectious waste is managed by each medical facility in 20 health administrative districts under the jurisdiction of the Ministry of Health (SESAL), which is the government agency responsible for the management of infectious waste, based on the "Regulation for the Management of Infectious Hazardous Waste Generated from Healthcare Facilities (2008)" (Regulamento 2008). There are no detoxification facilities in operation at medical facilities in Honduras, and national and public hospitals located around the country outsource the collection and transportation of infectious waste generated in hospitals to private companies. Moreover, the infectious waste is transported to the landfill site without detoxification treatment and disposed of in a dedicated area or landfilled with general waste. The association of municipalities (AOMs), which is composed of multiple municipalities, also works to build a wide-area management system that separates and collects infectious waste from medical facilities, develops dedicated sections at landfill sites, and disposes of them in landfills.

However, due to the lack of collection and transport vehicles and heavy equipment for landfill sites, it is not possible to treat the increase in the amount of infectious waste generated under the spread of COVID-19 infection. Since infectious waste is stored, collected and transported mixed with general waste without separation, there is concern about the risk of secondary infection to medical workers, waste management workers and nearby residents, therefore strengthening the management system of infectious waste is urgently needed.

Under such circumstances, the Government of Honduras proposed the Infectious Waste Management Improvement Project (the Project) for the purpose of introducing detoxification equipment necessary for infectious waste management and equipment for collection, transportation, and final disposal.

Table 1 Request from the Government of Honduras

No.	Hospital	Department	Requested Equipment		Q'ty
1	General San Felipe	Francisco Morazan	Waste Detoxification Equipment		2
2	INCP	Francisco Morazan	Waste Detoxification Equipment		1
3	Puerto Cortés	Cortes	Waste Detoxification Equipment		1
4	Leonardo Martínez Valenzuela	Cortes	Waste Detoxification Equipment		1
5	Mario Catarino Rivas	Cortes	Waste Detoxification Equipment		2
6	Gabriela Alvarado	Paraiso	Waste Detoxification Equipment		1
7	Santa Bárbara	Santa Barbara	Waste Detoxification Equipment		1
			Infectious Waste Collection Vehicle		1
8	General Atlántida	Atlantida	Waste Detoxification Equipment		1
9	General San Francisco	Olancho	Waste Detoxification Equipment		1
10	Santa Teresa	Comayagua	Waste Detoxification Equipment		1
11	Hospital Del Sur	Choluteca	Waste Detoxification Equipment		1
No.	**Associations of Municipalities**	**Requested Equipment**			**Q'ty**
1	Valle de Sensenti (MANVASEN) and Guisayote	Waste Detoxification Equipment			1
		Infectious Waste Collection Vehicle			1
		Heavy Machine for Final Disposal Sites		Bulldozer	1
				Excavator	1
2	Mancurisj	Waste Detoxification Equipment			1
		Infectious Waste Collection Vehicle			1
		Heavy Machine for Final Disposal Sites		Bulldozer	1
				Excavator	2
		Truck Scale			1
3	Amuprolago	To be determined			-

3. Outline of the Survey/Design and Contents of the Project

In this preparatory survey, the first site survey was conducted from July to August 2022 to decide the policy of the outline design and project plan. After the detailed project planning in Japan, the second site survey was conducted in January 2023, and consent was obtained from the relevant agencies regarding the survey contents and project plan.

The purpose of the Project is "To aim to improve the implementation of the collection, transportation, treatment and final disposal of infectious waste as well as the management capacity of the implementing agencies by providing equipment to major hospitals and landfill sites in Honduras". In order to achieve the purpose above, the necessary equipment will be procured, and a soft component will be implemented with the aim of establishing an operation and maintenance system for the sterilizer among the procured equipment.

Table 2 Project Components

No.	Equipment	Quantity	Breakdown of the Target Facilities	
			Hospital	AOMs
Procurement of Equipment				
1	Sterilizers (50kg/1 cycle)	15	13	2
2	Transformer (30kVA or more)	13	11	2
3	Container (20ft)	15	13	2
4	Bulldozer (21t)	3	-	3
5	Excavator A (Bucket 0.8m^3)	2	-	2
6	Excavator B (Bucket 0.5m^3)	2	-	2
7	Pick-up Truck (2,000~3,000cc)	4	1	3
8	Truck Scale (45t)	1	-	1
9	Waste Container and Cart	44	44	-
10	Weighing Scale	11	11	-
11	Repair Tool for Equipment (High-pressure washing machine and Air compressor)	2	-	2
Soft Component				
Goal of the Soft Component	To establish a sustainable O&M system for the procured equipment in SESAL and the target hospitals and AOMs, and to supervise and manage infectious waste in a safe and hygienic manner			
Output 1:	Capacity and function to supervise infectious waste by SESAL is strengthened.			
Output 2	The status of infectious waste management is grasped at the target hospitals, and appropriate O&M of procured equipment related to waste management is implemented.			
Output 3	The status of infectious waste management by target AOMs is grasped, and appropriate O&M of procured equipment is implemented.			

4. Implementation Period

The project period is scheduled to be 6.5 months for detailed design (including bidding period) and 16.5 months for equipment procurement.

5. Project Evaluation

(1) Relevance

1) Urgency

Procurement of the equipment by the Project will contribute to the appropriate management of infectious waste, which is rapidly increasing due to the spread of COVID-19, and reducing the risk of emergency secondary infection.

2) Consistency with National Policy

The Project aims to achieve the separate collection and appropriate detoxification of infectious waste through the procurement of sterilizers and other equipment for 11 hospitals and three AOMs in Honduras, which contribute to the national policy for COVID-19 in Honduras.

(2) Effectiveness

1) Quantitative Evaluation

As an indicator of the quantitative effect of the Project, the “Amount of infectious waste sterilized at medical institutions” is set as shown in Table 3.

Table 3 Quantitative Effect Indicators and Target Values

Index Name	Base Value (Actual value in 2021))	Target Value (in 2028) Three years after completion of the Project
Amount of infectious waste sterilized at medical institutions (kg/day)	0	2,585

2) Qualitative Effects

The qualitative effects of the Project are as follows:

- Strengthening of the system for separate collection and transport of infectious waste and management of landfill sites in 21 municipalities in the rural areas that compose the AOMs;
- Strengthening of the system of separate storage and collection of infectious wastes at national and public hospitals; and
- Reduction of the risk of waste-derived infectious diseases among healthcare workers, waste-related workers and waste pickers at landfill sites in the target areas.

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1	San Felipe	Francisco Morazán (Tegucigalpa)
2	INCP	Francisco Morazán (Tegucigalpa)
3	Puerto Cortes	Cortés
4	Leonardo Martínez	Cortés
5	Mario Catarino Rivas	Cortés
6	Gabriela Alvarado	El Paraíso
7	Santa Bárbara	Santa Bárbara
8	General Atlántida	Atlántida
9	San Francisco	Olancho
10	Santa Teresa	Comayagua
11	Hospital Del Sur	Choluteca

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ABBREVIATIONS

AOMs	Associations of Municipalities
ARSA	Agencia de Regulación Sanitaria
A/P	Authorization to Pay
B/A	Banking Arrangement
BCH	Banco Central de Honduras
B/L	Bill of Landing
CABEI	Central American Bank for Economic Integration
COVID-19	Coronavirus Disease 2019
D/D	Detailed Design
DECA	Directorate General for Environmental Evaluation and Control
E/N	Exchange of Note
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
G/A	Grant Agreement
GDP	Gross Domestic Products
GHGs	Greenhouse Gases
GOH	The Government of Honduras
GOJ	The Government of Japan
HNL	Honduras Lempira
ICU	Intensive Care Unit
IDB	Inter-American Development Bank
JICA	Japan International Cooperation Agency
JPY	Japanese Yen
NGO	Non-Governmental Organization
O&M	Operation and Maintenance
PAHO	Pan American Health Organization
POPs	Persistent Organic Pollutants
PPE	Personal Protective Equipment
SEA	Strategic Environmental Assessment
SESAL	Secretaría de Estado en el Despacho de Salud
SERNA	Secretaría de Energía, Recursos Naturales, Ambiente y Minas
SINEIA	Reglamento del Sistema Nacional de Evaluación de Impacto Ambiental
SLAS	Sistema de Licenciamiento Ambiental Simplificado
SWM	Solid Waste Management
TOR	Terms of Reference
UNDP	United Nations Development Programme
USAID	US Agency of International Development
USL	Unidad de Servicios Legales
UTGP	Unidad Técnica de Gestión de Proyectos
WB	The World Bank
WHO	World Health Organization

CHAPTER 1. BACKGROUND OF THE PROJECT

1.1 Background of the Project

The Republic of Honduras (hereinafter referred to as "Honduras") has a land area of 112,490 km^2 (about one-third the size of Japan), a population of 10,062,994 (in 2021, World Bank), and is located in the central part of Central America, bordering Guatemala to the west, El Salvador to the southwest, Nicaragua to the southeast, the Caribbean Sea to the north, and the Pacific Ocean to the south via the Gulf of Fonseca.

Since Honduras is positioned as a low-middle-income country in Latin America region and has a weak healthcare system, with the spread of the Coronavirus disease 2019 (hereinafter referred to as "COVID-19"), it is necessary to properly manage infectious waste to prevent biohazards for essential workers including health and medical workers and nearby residents.

Although there are laws, regulations, and official manuals for infectious waste management in Honduras, in-hospital separation, collection and transportation, detoxification, and landfill disposal are not properly implemented. The responsibility for management of waste generated in medical facilities lies with the medical institutions that generate the waste. While, the improper management, such as the mixing of infectious waste into common waste, has a significant impact and burden on municipalities that are in charge of municipal waste management.

At large-scale medical facilities in major urban areas such as Tegucigalpa metropolitan area, infectious waste is separated and stored inside the hospital and contracted private companies are responsible for the internal collection and external transport to the final disposal site waste. While some small municipalities have organized associations of municipalities (hereinafter referred to as “AOMs”), they jointly treat and dispose of solid waste including infectious waste. However, none of them are equipped with enough equipment, systems and know-how necessary for infectious waste management so that it is necessary to improve them as soon as possible through the Project.

Although AOMs are promoting rationalization, including the construction and operation of shared disposal facilities, they lack human resources, technology, knowledge, and equipment, and their systems for municipal waste management (from collection and transportation to final disposal), including dealing with infectious waste, are not yet sufficiently developed. Therefore, the Japan International Cooperation Agency (hereinafter referred to as “JICA”) plans to support capacity building in waste management through a new technical cooperation project, “Technical Assistance for Establishing a Municipal Cooperative Management Model for Integrated Solid Waste Management”.

1.2 Requested Items and Summary of the Survey

The Government of Honduras (hereinafter referred to as “GOH”) has requested items as shown in Table 1.1:

Table 1.1 Request from the GOH

No.	Hospital	Department	Requested Equipment		Q'ty
1	General San Felipe	Francisco Morazan	Waste Detoxification Equipment		2
2	INCP	Francisco Morazan	Waste Detoxification Equipment		1
3	Puerto Cortés	Cortes	Waste Detoxification Equipment		1
4	Leonardo Martínez Valenzuela	Cortes	Waste Detoxification Equipment		1
5	Mario Catarino Rivas	Cortes	Waste Detoxification Equipment		2
6	Gabriela Alvarado	Paraiso	Waste Detoxification Equipment		1
7	Santa Bárbara	Santa Barbara	Waste Detoxification Equipment		1
			Infectious Waste Collection Vehicle		1
8	General Atlántida	Atlantida	Waste Detoxification Equipment		1
9	General San Francisco	Olancho	Waste Detoxification Equipment		1
10	Santa Teresa	Comayagua	Waste Detoxification Equipment		1
11	Hospital Del Sur	Choluteca	Waste Detoxification Equipment		1
No.	**Associations of Municipalities**	**Requested Equipment**			**Q'ty**
1	Valle de Sensenti (MANVASEN) and Guisayote	Waste Detoxification Equipment			1
		Infectious Waste Collection Vehicle			1
		Heavy Machine for Final Disposal Sites		Bulldozer	1
				Excavator	1
2	Mancurisj	Waste Detoxification Equipment			1
		Infectious Waste Collection Vehicle			1
		Heavy Machine for Final Disposal Sites		Bulldozer	1
				Excavator	2
		Truck Scale			1
3	Amuprolago	To be determined			-

[List of Requested Equipment]

Equipment	Quantity
Waste Detoxification Equipment (50kg/1 cycle)	15
Transformer (37.5kVA)	13
Container (20ft)	13
Bulldozer (21t)	2
Excavator (Bucket 0.8m^3)	3
Infectious waste collection vehicle (Pick-Up Truck: 2,000~3,000cc)	3
Truck Scale (45t)	1
Others (Waste containers, Carts, and Weighing Scales)	-

This preparatory survey (hereinafter referred to as "the Survey") for the Project for Improvement of Infectious Waste Management in Honduras (hereinafter referred to as "the Project") was commenced with the purpose of procurement of equipment based on the request above as shown in Table 1.2.

Table 1.2 Summary of the Survey

(1) Purpose of the Survey	The purpose of the Survey is to confirm the current status and issues related to the separation, storage, collection, transportation, detoxification, and final disposal of infectious waste in Honduran health care institutions and waste management entities, to clarify the contents of equipment and materials and capacity building required to achieve an appropriate treatment flow, and to consider the purpose and contents of possible future cooperation.
(2) Target Area	The whole area of Honduras
(3) Business Content	■ Equipment: Infectious waste detoxification facilities (incinerators, autoclaves, microwave, etc.), vehicles for collecting and transporting the infectious waste (container carriers, containers, trucks, etc.), equipment for final disposal site operation and maintenance (bulldozers, excavators, etc.), spare parts, maintenance equipment, and any other relevant equipment required will be considered for their necessity and adequacy through the Survey. ■ Soft component: Assistance in developing a healthcare waste management plan utilizing the above equipment, establishment of an operation and maintenance management system for the equipment, and guidance related to occupational health and safety are envisioned. Necessity and adequacy will be considered in the Project.
(4) Relevant Government Agencies and Institutions	Secretaría de Estado en el Despacho de Salud (hereinafter refered to as "SESAL") Healthcare Facilities, AOMs

Source: Prepared by JICA survey team. In the following sections of this report, all sources are prepared by the JICA survey team unless otherwise indicated.

1.3 Assistance by Japan

Japan's assistances to the solid waste management sector in Honduras are as shown in Table 1.3 below.

Table 1.3 Japan's Assistance to the Solid Waste Management Sector

No.	Implementation Year	Name	Outline
1	2013～2017	Dispatch of JICA Expert on Solid Waste Management for Associations of Municipalities	Capacity development on urban solid waste management and infectious waste management for municipalities including Sensenti and other associations of municipalities
2	2016～2019	Dispatch of JICA Expert on Capacity Development on Solid Waste Management for Associations of Municipalities	

1.4 Environmental Condition

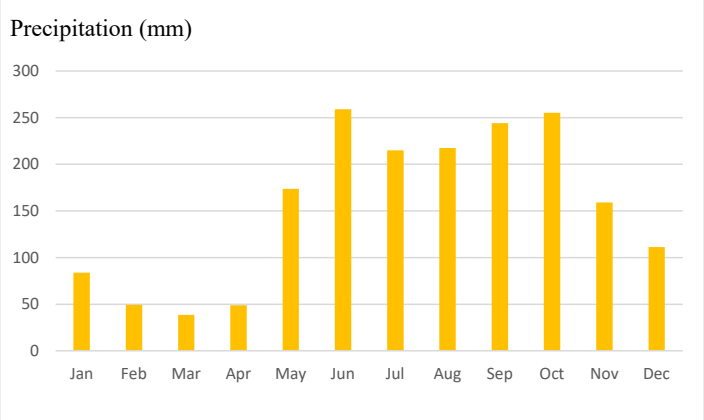
1.4.1 Climate

The climate of Honduras is tropical with an average annual temperature of 26-29°C in the coastal lowlands, with little temperature range throughout the year. On the other hand, the central highlands are temperate with an average annual temperature of 16-24°C. The average annual rainfall is the lowest in the central mountains (800-2,000mm) and the highest in the Caribbean coastal region (more than 2,000mm) where rainfall is high throughout the year. There are rainy and dry seasons, with the dry season (summer) from November to April and the rainy season (winter) from May to October.

1.4.2 Precipitation

Figure 1.1 shows the average monthly precipitation in Honduras from 1991 to 2020. There are two seasons, the dry season from November to April, and the rainy season from May to October. The average rainfall in June, the month with the most rainfall, is about 260mm. The dry season has little rainfall,

especially between February and April. The average annual rainfall is estimated to be approximately 1,860 mm during the survey period.



Source: World Bank

Figure 1.1 Monthly Average Precipitation (1991-2020)

1.4.3 Topography and Geology

Honduras is located in the center of the isthmus that connects North and South America, facing the Caribbean Sea to the north and the Pacific Ocean to the south. The country is divided into the northern coastal lowland (Caribbean side), the central mountainous (plateau) region, and the southern coastal lowland (Pacific side). The central mountainous region is the largest of the three divisions, accounting for 70% of the country. Approximately 50% of this area is a plateau with an altitude of 900m or more.

The strata become new from north to south, and the northern part consists of Paleozoic metamorphic rocks, Mesozoic sedimentary rocks, and igneous rocks that intruded into these rocks. Tertiary volcanic rocks are distributed in the central part, and the Quaternary volcanic belt in the southern part forms part of the Pacific Ring of Fire. While there are no active volcanoes in Honduras.

1.5 Environmental and Social Considerations

1.5.1 Project Components that Affect the Environment and Social Condition

The Project is designated as Category C in the "JICA Guidelines for Environmental and Social Considerations (January 2022)" (hereinafter referred to as “JICA Guidelines”) since it involves only equipment procurement, which has minimal environmental and social impacts, and does not involve new site acquisition, involuntary resettlement or economic relocation. In Honduras, the introduction of sterilizers as waste detoxification equipment requires the acquisition of an environmental license for operation and management, but this procedure can be omitted by agreement between the SESAL and the Ministry of Energy, Natural Resources, Environment and Mines (hereinafter referred to as "SERNA", *Secretaría de Energía, Recursos Naturales, Ambiente y Minas*).

Therefore, while the procedure for obtaining an environmental license is to be exempted in the Project, the information necessary to obtain an environmental license for the operation and management of sterilizers was summarized as shown in Table 1.4 to examine the impact of the introduction of sterilizers. Note that an environmental license is not required for heavy equipment to be introduced into landfill sites.

Table 1.4 Project Components to be Considered for Environmental and Social Considerations

No.	Hospital	Department	Requested Equipment
1	General San Felipe	Francisco Morazan	Sterilizer
2	INCP	Francisco Morazan	Sterilizer
3	Puerto Cortés	Cortes	Sterilizer
4	Leonardo Martínez Valenzuela	Cortes	Sterilizer
5	Mario Catarino Rivas	Cortes	Sterilizer
6	Gabriela Alvarado	Paraiso	Sterilizer
7	Santa Bárbara	Santa Barbara	Sterilizer
8	General Atlántida	Atlantida	Sterilizer

No.	Hospital	Department	Requested Equipment
9	General San Francisco	Olancho	Sterilizer
10	Santa Teresa	Comayagua	Sterilizer
11	Hospital Del Sur	Choluteca	Sterilizer
No.	**Associations of Municipalities**	**Department**	**Requested Equipment**
1	Valle de Sensenti (MANVASEN) and Guisayote	-	Sterilizer
2	Mancurisj	-	Sterilizer

1.5.2 Basic Environmental and Social Conditions

For each hospital and two AOMs, namely, Sensenti/Guisayote and Mancurisj where sterilizers are planned to be installed, there are no areas designated as environmental protection zones.

1.5.3 Environmental and Social Consideration System/Organization in Honduras

(1) Laws and Guidelines relating to Environmental Impact Assessment

The main regulations and guidelines related to environmental and social considerations in Honduras, including amendments, are listed in Table 1.5 as follows:

Table 1.5 Laws and Guidelines related to the Environmental and Social Considerations of the Project

Title	Year
Ley General del Ambiente (Decreto No. 104-1993)	1993.06
Decreto 181 2007 Reforma Ley General del Ambiente	2007.12
Acuerdo N°109-93 – Reglamento General de la Ley del Ambiente	1994.02.
Acuerdo Nº 189/09 – Reglamento del Sistema Nacional de Evaluación de Impacto Ambiental (SINEIA) Acuerdo Ejecutivo No. 005-2019	2009.12 2019.08 Latest Revision
Acuerdo Nº 887/09 – Reglamento de áuditorías ambientales	2009.07
Acuerdo Nº 826/09 – Reglamento del Registro nacional de prestadores de servicios ambientales	2009.06
Acuerdo Nº 635/03 – Criterios para determinar la categoría de ingreso de los proyectos que solicitan una autorización ambiental Acuerdo Ministerial No. 705-2021	2003.11 2021.05 Latest Revisions
Decreto N°181-2009 – Ley general de aguas	2009.12
Decreto Nº 292/98 – Ley General de Minería	1998.12
Decreto N°98-2007 – Ley Forestal, Áreas Protegidas y Vida Silvestre	2008.02
Real Decreto 997/2002, de 27 de septiembre, por el que se aprueba la norma de construcción sismorresistente: parte general y edificación (NCSR-02)	2002.10
Decreto Nº 65/91 – Código de Salud Decreto No. 194-96	1991 1996.12 Latest Revisions
Secretaria de salud publica Acuerdo No.0094 Junio, 1997	1997.06
Ley sobre la Phytophthora (Decreto Nº 154-1997)	1995.01
Acuerdo-06-2005- Reglamento para el Control Sanitario	2005.09
Reglamento para la regulación de las emisiones de gases contaminantes y humo de los vehículos automotores	2000.05
Decreto 173-2019, No. 35178 del 18 de febrero del 2020: Ley Marco de Vivienda y Asentamientos Humanos	1959.05
Decreto N° 180-2003 Ley de Ordenamiento Territorial de Honduras	2003.12
Acuerdo Nº 25-2004 – Reglamento general de la Ley de ordenamiento territorial	2004.08

(2) Environmental License Procedures

The procedure for obtaining an environmental license is mainly indicated in the "National Environmental Impact Assessment System" (*Reglamento del Sistema Nacional de Evaluación de Impacto Ambiental*, hereinafter referred to as "SINEIA"). SINEIA is under the jurisdiction of SERNA under the General Environment Law (Decreto No.104-93). According to SINEIA, it is possible to apply for multiple environmental licenses at once, provided that the following requirements are met.

1) To be the same activity.
2) To be by the same bidder.
3) The target area must be located in the same municipality.
4) The total area of the project should not exceed 10 km^2.

In the Project, two hospitals in Tegucigalpa (General San Felipe, INCP) and two hospitals in San Pedro Sula (Leonardo Martínez Valenzuela, Mario Catarino Rivas) meet the above requirements, so it is possible to apply together.

(a) Category Classification

SINEIA's categorization has four levels, Categories 1-4, each defined as follows:

- Category 1: Projects considered to have low potential environmental impact or risks
- Category 2: Projects considered to have medium potential environmental impact or risks
- Category 3: Projects considered to have high potential environmental impacts or risks
- Category 4: Projects with extremely high potential environmental impacts or risks

In the discussions with the Directorate General for Environmental Evaluation and Control (hereinafter referred to as "DECA") of the SERNA conducted on August 2022, it was confirmed that the Project falls under Category 3 in the SINEIA categorization (Acuerdo No. 705-2021) as presented in Table 1.6. Since it was also confirmed that an Environmental Impact Assessment (hereinafter referred to as "EIA") is not required and an Environmental Management Plan (hereinafter referred to as "EMP") is necessary for the Project, EMP was prepared by the environmental survey conducted in the Survey as a sub-contracting survey.

Table 1.6 Excerpts from the Categorization (Acuerdo No. 705-2021)

Sector	Subsector	Activity	Contents	Category			
				1	2	3	4
Sanitation	Waste Disposal	Special Waste Disposal	Medical or Similar Waste, Incineration, etc.	-	-	All	-

(b) Requirements for applying for an Environmental License

In case a project requires the procedure for obtaining the environmental license, the project shall be required for the submission of the materials and information in Table 1.7 that meet the requirements of the Simplified Environmental Licensing System (*Sistema de Licenciamiento Ambiental Simplificado*, hereinafter referred to as "SLAS").

Since a project is public, "No. 13 Opening bank Deed" and "No. 16 Receipt of fee for issuance of environmental license" can be exempted by submitting a letter regarding exemption application from the implementing agency to SERNA.

Table 1.7 Environmental License Application Requirements

No.	Environmental License Application Requirements	Responsible Organization
1	Official Report on the Environmental Licensing System	PSA
2	Application for Environmental License	SESAL
3	Power of Attorney	SESAL
4	Environmental Management Measures" issued under the Environmental Permit System	PSA
5	Copy of Tax Registration (certified) of SESAL	SESAL
6	Copy of SESAL's legal representative's ID card	SESAL
7	Affidavit of SESAL's legal representative	SESAL
8	Affidavit by PSA (*Prestador de Servicios Ambientales*: consultant registered as an environmental service provider)	PSA
9	Lease Agreement or Title Deed Transferring Ownership of the Project Site	SESAL
10	SESAL Certificate of Incorporation	SESAL
11	Verification Report by PSA	PSA
12	Receipt of on-site Inspection Fee by DECA	SESAL
13	Original Bank Deed	SESAL
14	Information from Newspapers that Published Notice of Application Submission (if applicable)	SESAL
15	Technical tool for the category: Environmental Management Plan	PSA
16	Receipt of fee for issuance of environmental license (T.G.R. 1.)	SESAL
17	Project location information	SESAL

(c) Environmental License Acquisition Costs

The following costs are basically incurred in obtaining an environmental license. The costs to be incurred by targeted hospitals and the two AOMs (Sensenti/Guisayote and Mancurisj) are shown in Table 1.8.

1) Environmental License Issuance Fee
2) On-site Inspection Fee by DECA
3) Bank Guarantee Fee

Table 1.8 Environmental License Fees Incurred for the Targeted Hospitals and AOMs

No.	Hospital	Location	Cost Item	Cost ($)	Remarks
1	General San Felipe	Tegucigalpa	Environmental License Issuance Fee	2,012	Exemptable
2	INCP		On-site Inspection Fee by DECA	0	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
3	Puerto Cortés	Puerto Cortes	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
4	Leonardo Martínez Valenzuela	San Pedro Sula	Environmental License Issuance Fee	2,012	Exemptable
5	Mario Catarino Rivas		On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
6	Gabriela Alvarado	Danli	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
7	Santa Bárbara	Santa Barbara	Environmental License Issuance Fee	2,012	Exemptable
			On-site inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
8	General Atlántida	La Ceiba	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable

No.	Hospital	Location	Cost Item	Cost ($)	Remarks
9	General San Francisco	Juticalpa	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
10	Santa Teresa	Comayagua	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
11	Hospital Del Sur	Choluteca	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
No.	**AOM**	**Location**	**Cost Item**	**Cost ($)**	**Remarks**
1	Sensenti/Guisayote	San Marcos, Ocotepeque	Environmental License Issuance Fee	2,012	Exemptable
			On-site inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable
2	Mancurisj	San Juan Intibucá	Environmental License Issuance Fee	2,012	Exemptable
			On-site Inspection Fee by DECA	284	-
			Bank Guarantee Fee	1% of the project cost	Exemptable

Note: The fee for issuing an environmental license is five times the minimum wage in Honduras. The minimum wage depends on the number of employees in the organization.

(d) Flow of Obtaining an Environmental License

A schematic flow of the acquisition of the environmental license is shown in Table 1.9.

Table 1.9 Schematic Flow of Environmental License Acquisition

Application Process for Environmental License	In charge of Implementation
Register on SERNA's Environmental Licensing consultation web page and enter general information about the operator and the project. Based on the information entered, the system defines the technical and legal requirements for the category	PSA or SESAL
↓	
Submit materials and information that meet defined technical and legal requirements	PSA
↓	
Advisory Committee (Executive Director, Director of DECA, Legal Unit (*Unidad de Servicios Legales*, hereinafter referred to as "USL")) review by the Director General	Advisory Board
↓	
Environmental Control Measures Compliance Agreement signed and environmental license issued	General Secretary
↓	
Conduct on-site inspections and issue a report and technical opinion that determines whether or not an environmental license should be granted.	DECA
↓	
Based on the above report and technical opinion, determine whether an environmental license should be granted.	USL
↓	
Issuance of resolutions and environmental licenses, including updated environmental management measures	General Secretary

Source: Prepared by the survey team based on SINEIA regulations.

1.5.4 Comparison of Alternatives (including Zero Option)

(1) Zero Option (Option not to Implement the Project)

In Honduras, infectious waste is not properly detoxified and disposed of. It is collected, transported and disposed of with general waste mixed. The zero option will not be adopted since the healthcare

system is weak and prevention of infection among essential workers including health and medical personnel is extremely important, and reducing the risk of secondary infection through proper management of infectious waste is an urgent issue in Honduras.

(2) Comparison of Alternatives

As shown in Table 1.10, detoxification treatment equipment for the infectious waste can be broadly classified into sterilizers (autoclaves, microwaves and friction heat) and incinerators.

Incinerators can safely reduce the volume and detoxify the waste, but they are more expensive to maintain than other types of detoxification equipment and require an environmental impact assessment process before installation. Autoclaves have already been introduced in Honduras in large numbers, and their relatively simple structure means that they do not require advanced technology for failure or parts replacement. On the other hand, microwaves are easy to maintain since they do not require water and do not generate wastewater, and also have a crushing function. The friction heat also requires additional equipment, but maintenance is easy. They are not initially superior each other in terms of functionality and maintenance.

Therefore, in the Survey, the project plan for sterilizers was investigated in consideration of environmental and social considerations, maintenance management, and the project implementation process.

Table 1.10 Comparison of Detoxification Equipment Options

Type	Sterilizer (Autoclave)	Sterilizer (Microwave)	Sterilizer (Friction Heat)	Incinerator (small)	Incinerator (medium/large)
Photo[*1]					
Processing Method	・Using the thermal energy of high-temperature, high-pressure steam for sterilization ・Treatment at 121°C or higher for at least 20 minutes	・Using high frequency for sterilization ・Treatment at 95-100°C or higher for at least 30 minutes	・Heat-treats up to 150°C by impact and friction with a rotor fitted with blades	・Intermediate treatment method in which refuse is oxidized at high temperatures for hygienic treatment and volume reduction, and discharged as incineration residue ・Incineration temperature is 800°C or higher.	
Features	・High sterilization effect due to the synergistic effect of temperature, humidity, and time ・Applicable to most infectious wastes ・Pre-treatment such as crushing is necessary in case	・Uniform heat sterilization of waste from surface to interior ・Not suitable for liquid, muddy or pathological wastes ・Requires fine cutting to facilitate heat and steam distribution	・Uniform treatment by crushing and heating at the same time ・Risk of secondary contamination is low because the waste is treated through a series of processes after input	・Safest and most volume-reducing ・Can be installed in a relatively small space	・Safest and most volume-reducing ・Large incinerators are the standard to comply with various regulations regarding incinerators
Sanitation/ Environment	・Microorganisms are resistant to dry heat, so inappropriate use should be avoided such as if they are left exposed to air without sufficient steam displacement for sterilization.	・Possible generation of foul odor during treatment ・High biochemical oxygen demand (BOD) in case of generation of treated sewage ・Possible exposure to vaporized chemicals	・Drainage of treated water is generated due to the need for water supply and drainage	・It is important to incinerate the materials in their packed state to avoid infection or other hazards during the operation. ・Fear of dioxin generation if combustion is not complete (exhaust gas treatment equipment, including dioxin abatement equipment, must be provided).	
Regulations	・Relatively Simple	・Relatively simple	・Relatively simple	・Strict[*2]	

Type	Sterilizer (Autoclave)	Sterilizer (Microwave)	Sterilizer (Friction Heat)	Incinerator (small)	Incinerator (medium/large)
Procurement & Maintenance	・Confirmed introduction in Honduras	・Relatively easy to maintain, but requires constant and appropriate maintenance	・Relatively easy to maintain, but requires constant and appropriate maintenance	・Relatively easy to maintain, but requires constant and appropriate maintenance	・High level of technology is required ・A support system by a specialized manufacturer is necessary.
Cost	・Low cost compared to incineration	・Less expensive than incineration	・Less expensive than incineration	・Large installation costs for dioxin control, plus high maintenance costs	

Note: *1 Photo: From the website of Hirayama Seisakusho Corporation / Eco Cycle Kochi Foundation / Kassui Plant Co. / Newster System S.r.l.
*2 According to local regulations, the incineration process requires specifications that meet the dioxin control requirements of primary combustion at 850°C or higher and secondary combustion at 1,300°C or higher.

(3) Comparison with JICA Guidelines

The existence of gaps between SINEIA and JICA Guidelines for environmental and social considerations was summarized in Table 1.11.

Table 1.11 Comparative Table of JICA Guidelines and Honduran SINEIA

Item	JICA Guidelines	SINEIA, Honduras	Policy in the Project
Basic Matter	In implementing a project, the environmental and social impacts of the project should be studied and examined as early as possible in the planning stage, and alternatives and mitigation measures to avoid or minimize such impacts should be considered, the results of which should be reflected in the project plan.	No difference from JICA Guidelines.	Follow JICA Guidelines
Category Classification	Category A: Projects that are likely to have significant and undesirable impacts on the environment and society. Category B: Cooperative projects that are considered to have less undesirable impacts on the environment and society compared to Category A. Category C: Cooperative projects that are considered to have minimal or no undesirable impacts on the environment or society. Category FI: Projects where JICA financing is provided to a financial intermediary, etc., and the financial intermediary, etc., after JICA's approval of the financing, selects and examines the specific subproject, and the subproject cannot be identified before JICA's approval (or project review), and such the subproject is expected to have environmental or social impacts.	Category 1: Projects considered to have low potential environmental impact or environmental risk. Category 2: Projects considered to have medium potential environmental impact or risk. Category 3: Projects that are considered to have significant potential environmental impacts or risks. Category 4: Projects that are considered to have very high potential environmental impacts or risks. Mega development projects are also included in this category.	No significant differences. The environmental category shall be determined by checking the categorization table (Acuerdo Ministerial No. 705-2021) and the SERNA.
Information Disclosure	The Environmental Assessment Report must be publicly available in the country where the project is implemented, including to local residents and other stakeholders, and must be accessible to local residents and other stakeholders at all times, and copies must be available for acquisition.	SINEIA regulations provide for public notice of the environmental impact assessment process in newspapers and broadcasters, and public inspection in public libraries.	Through both systems, the company will consult with the relevant municipalities as necessary.
Impact Assessment Items	The scope of environmental and social considerations to be studied and reviewed includes impacts on human health and safety and the natural environment (including transboundary or global environmental impacts) through air, water, soil, waste, accidents, water use, climate change,	Category 3 environmental management plans include: emissions to the atmosphere; generation of ordinary, toxic, and hazardous solid wastes; production of stormwater,	The items listed in the JICA Guidelines shall be covered.

Item	JICA Guidelines	SINEIA, Honduras	Policy in the Project
	ecosystems and biota, as well as social considerations for such matters as Population displacement, including involuntary resettlement; local economies, including employment and livelihoods; land use and local resource use; social organizations, including social capital and local decision-making bodies; existing social infrastructure and social services; socially vulnerable groups such as the poor and indigenous peoples; equity in the distribution of harm and benefits and in the development process; gender Children's rights, cultural heritage, regional conflicts of interest, HIV/AIDS and other infectious diseases, and the work environment (including occupational safety).	domestic and industrial wastewater; handling of raw and construction materials; natural disasters; soil and groundwater; local biodiversity; protected areas; socio-economic and cultural environment of the project area and surrounding areas; landscape aspects; public or citizen participation.	
Consistency with Laws and Regulations	Confirm that the project complies with laws, regulations, standards, etc. related to the environment and local communities established by the partner country and the local government concerned, and that it is in line with policies and plans related to the environment and local communities.	Comply with environmental laws, SINEIA, etc.	No differences
Social Consensus	Projects must be well coordinated so that consensus can be reached in a socially appropriate manner in the country or region where it is planned. Particularly for projects that are considered to have a significant impact on the environment, information must be made publicly available and sufficient consultation with local residents and other stakeholders must take place, even at an early stage when alternatives are being considered, and the results of such consultation must be reflected in the project content.	Article 58 of Acuerdo Ejecutivo No. 005-2019 states that the participation of civil society organizations is encouraged at all stages of the environmental impact assessment process. Article 59 stipulates that the project proponent must involve the neighbors of the project area from the earliest stages of the EIA. Article 25 requires all projects to disclose information through newspapers when applying for environmental licenses.	No differences. Discussion from an early stage will be proceeded.
Biological Phase of Ecological System	Projects shall not involve significant conversion or significant degradation of critical natural habitats or critical forests.	The Forest Law imposes restrictions on development.	No differences
Involuntary Resettlement	Every effort shall be made to avoid involuntary resettlement and loss of means of livelihood. Those affected by involuntary resettlement and loss of means of livelihood shall be given adequate compensation and assistance by the counterparty, etc. at the appropriate time. Compensation shall be based on reacquisition prices whenever possible, and shall be provided in advance. For projects involving large-scale involuntary resettlement, a resettlement plan must be prepared and made publicly available	Chapter 4 of the "Law on Special Measures for Simplification of Procedures for Infrastructure Investment Projects (DL58-2011)" states that the WB rules (OP4.12) shall apply to involuntary resettlement. The WB OP4.12 is fully complied with.	If involuntary resettlement occurs, it will be avoided as much as possible in accordance with WB OP 4.12 and JICA Guidelines.
Indigenous Peoples	Every effort must be made to avoid the impacts of the project on indigenous peoples by considering all possible means. If avoidance is not possible after such consideration, effective measures for indigenous peoples must be taken to minimize impacts and compensate for losses.	There is no legislation providing for special consideration to indigenous peoples, but ILO Convention 169 is applied in some projects	If indigenous peoples will be affected, JICA Guidelines will be followed.

1.5.5 Scoping

Scoping was conducted for the procurement of sterilizers that requires an environmental license as shown in Table 1.12. Since the Project is an equipment procurement project, the impact after the equipment procurement (when the equipment is put into service) was to be evaluated. The impact items were listed under "13. Waste" in the "Environmental Checklist" of the JICA Guidelines.

Table 1.12 Scoping

Impact Item		Evaluation In service	Scoping Reason
(1)	Air Pollution		No impact on the atmospheric environment is anticipated by the sterilizer.
(2)	Water Pollution	✓	Depending on the model of sterilizer, treated wastewater may be generated.
(3)	Waste	✓	The volume of infectious waste could be reduced if there is a crushing process in the pretreatment of sterilization.
(4)	Soil Pollution		There is no anticipated impact of soil contamination due to equipment procurement.
(5)	Noise and Vibration	✓	Noise could be generated during the operation of the sterilizer.
(6)	Ground Subsidence		No impact of land subsidence by the sterilizer is anticipated.
(7)	Bad Odor	✓	Odors may be generated by the sterilization process.
(8)	Protected Areas		The site where the sterilizer is to be installed is not within an area designated as a protected area by Honduran law or international treaties.
(9)	Ecosystem		The impact on the ecosystem by the sterilizer is not expected.
(10)	Site Management		The impact on the site management by the sterilizer is not expected.
(11)	Resettlement		Resettlement will not occur by the Project.
(12)	Livelihoods		There will be no impact on the livelihoods of hospital personnel or landfill site personnel by the sterilizer.
(13)	Livelihoods		No significant increase in livelihoods or employment is expected by the sterilizer. No impact on the livelihoods of waste pickers (waste picking) is assumed due to the infectious waste.
(14)	Water Use		No water use impacts are expected by the sterilizer.
(15)	Cultural Heritage		There are no cultural heritage sites within the project site.
(16)	Landscape		The sterilizers will be installed on each hospital site or at the landfill site, and no landscape impact is anticipated.
(17)	Minorities and Indigenous Peoples		There are no ethnic minorities or indigenous peoples on the project site.
(18)	Gender		No gender impact is anticipated by the sterilizers.
(19)	Work Environment	✓	Since infectious waste is sterilized and treated as general waste, it is expected to reduce the risk of landfilling. There is concern about the risk of infection during the sterilization process.
(20)	Accidents	✓	There is concern about the risk of infection during the treatment process of the sterilizer.
(21)	Transboundary Impacts, and Climate Change		There is a risk of accidents occurring because the sterilizer has a limited operational track record.

1.5.6 TOR for Environmental and Social Considerations Survey

As a result of the scoping for the Project, the necessary surveys were investigated as shown in Table 1.13.

Table 1.13 TOR for Environmental and Social Considerations Survey

No.	Environmental Item	Survey Item	Survey Method
(2)	Water Pollution	Whether the sterilizer generates treated wastewater	Interviews with manufacturers
(3)	Waste	Whether the sterilizer is the crushing process or not	Interviews with manufacturers
(5)	Noise and Vibration	Noise during sterilizer operation	On-site inspection Interviews with manufacturers
(7)	Bad Odor	Odor after the sterilization process	Interviews with manufacturers
(19)	Work Environment	Laws and regulations related to occupational safety Impact of the project on the working environment	Survey of existing materials, interviews with relevant parties
(20)	Accidents	Potential for accidents	On-site inspection, interviews with manufacturers

1.5.7 Results of Environmental and Social Considerations Survey

The results of the survey conducted in accordance with the TOR planned in the previous section are shown below.

(1) Water Pollution

As a result of the interviews with the manufacturer, the sterilizer to be procured requires a small amount of water, but no wastewater is generated after treatment.

(2) Waste

The sterilizers to be procured will crush waste before sterilization. Crushing and heating will reduce the volume of infectious waste by about 85% and the weight by about 25%. In addition, the residue after the sterilization process can be disposed of as general waste which is leading to a reduction in the risk of infection during transportation.

(3) Noise and Vibration

Although a certain amount of noise is generated when the sterilizer is in operation, the impact of this noise is minimal since the sterilizer is operated inside a container. In addition, since the location of the installation is around the temporary storage area for infectious waste within the hospital and within the landfill site, the number of people affected by the noise is extremely small.

(4) Bad Odor

As a result of the interviews with the manufacturer, the sterilizer to be procured will not generate sewage after processing, and although some odor will be generated from the residue, the impact will be negligible. In addition, since the sterilizers will be operated inside a container, no impact by the bad odor on the surrounding environment is anticipated.

(5) Labor Environment

Since infectious waste is sterilized and handled as general waste, the risk of secondary infection for workers who collect, transport, and finally dispose of infectious waste is reduced.

On the other hand, there is a risk of infection to workers by infectious waste before treatment when using a sterilizer. Normally, accurate use of sterilizer and the wearing of safety equipment such as gloves and masks prevent infection by infectious waste and accidental injury during work. However,

since there is little experience in the operation of sterilizers by workers, when operating sterilizers, manufacturers' engineers should be dispatched at the time of procurement to provide initial operation guidance, and efforts should be made to establish an appropriate operation and maintenance (hereinafter referred to as "O&M") system with soft components as described in Chapter 2.

(6) Accidents

The sterilizer to be procured is a fully automatic (loading, sterilizing, and discharging) sealed system and is safe, so the risk of accidents occurring is minimal. For the O&M of the sterilizer, an O&M system will be established with initial operation guidance and the soft components.

1.5.8 Impact Assessment

Table 1.14 shows the results of the environmental impact assessment of the Project for the introduction of sterilizers.

Table 1.14 Results of Environmental Impact Assessment of the Project

Impact Item		Assessment*		Reason for Evaluation
		Scoping	After Survey	
(1)	Air Pollution			No impact on the atmospheric environment is anticipated by the sterilizer.
(2)	Water Pollution	✓	D	The sterilizers to be procured will not generate wastewater after the sterilization process.
(3)	Waste	✓	B+	Infectious waste will be crushed and heated during the sterilization process, reducing waste volume by up to 85% and weight by 25%. In addition, the residue after the sterilization process can be disposed of as general waste, reducing the risk of infection during transportation.
(4)	Soil Pollution			There is no anticipated impact of soil contamination due to equipment procurement.
(5)	Noise and Vibration	✓	D	Since the sterilizer will be operated inside the container, noise impact will be negligible.
(6)	Ground Subsidence			No impact of land subsidence due to the sterilizer is anticipated.
(7)	Bad odor	✓	D	The impact of odor is expected to be negligible because the processing will take place inside the containers.
(8)	Protected Areas			The site where the sterilizer is to be installed is not within an area designated as a protected area by Honduran law or international treaties.
(9)	Ecosystem			The impact on the ecosystem by the sterilizer is not expected.
(10)	Site Management			The impact on the site management by the sterilizer is not expected.
(11)	Resettlement			Resettlement will not occur by the Project.
(12)	Livelihoods			There will be no impact on the livelihoods of hospital personnel or landfill site personnel by the sterilizer.
(13)	Livelihoods			No significant increase in livelihoods or employment is expected by the sterilizer. No impact on the livelihoods of waste pickers (waste picking) is assumed due to the infectious waste.
(14)	Water Use			No water use impacts are expected by the sterilizer.
(15)	Cultural Heritage			There are no cultural heritage sites within the project site.
(16)	Landscape			The sterilizers will be installed on each hospital site or at the landfill site, and no landscape impact is anticipated.
(17)	Minorities and Indigenous Peoples			There are no ethnic minorities or indigenous peoples on the project site.
(18)	Gender			No gender impact is anticipated by the sterilizers.

Impact Item		Assessment*		Reason for Evaluation
		Scoping	After Survey	
(19)	Work Environment	✓	B+	Since it is necessary to handle the sterilizer correctly, the risk of infection by infectious waste can be reduced by providing the necessary safety equipment, as well as operation guidance and by establishing an appropriate O&M system.
(20)	Accidents	✓	D	The sterilizer to be procured is a fully automatic (loading, sterilizing, and discharging), sealed system, and safe, so the risk of accidents occurring is minimal. In addition, the manufacturer's engineers will be dispatched to the plant to provide initial operational guidance.
(21)	Transboundary impacts, and climate change			There is a risk of accidents occurring because the sterilizer has a limited operational track record.

Note: *Rating: B+: some positive impact expected, D: no impact expected

1.5.9 Mitigation Measures

Mitigation measures developed from the perspective of avoiding or reducing the anticipated negative impacts and maximizing the effectiveness of the sterilizer are shown in Table 1.15.

Table 1.15 Environmental Mitigation Measures

No.	Impact Item	Item	Implementing agency	Responsible Agency
(5)	Noise and Vibration	・Sterilizer operates with container door closed	Hospitals/AOMs	SESAL
(7)	Bad Odor	・Sterilizers are operated with the container doors closed	Hospitals/AOMs	SESAL
(19)	Work Environment	・Require workers handling sterilizers to wear safety equipment such as gloves and masks ・An operation guidance for workers and establishment of the O&M system through the Project	Manufacturer of sterilizer Hospitals/AOMs	SESAL
(20)	Accidents	・An operation guidance for workers and establishment of the O&M system through the Project	Hospitals/AOMs	SESAL

1.5.10 Environmental Monitoring Plan

A monitoring plan is formulated as shown in Table 1.16. The purpose of environmental monitoring is to ensure that mitigation measures are effectively implemented. The results of the environmental monitoring will allow the mitigation measures to be modified and corrective actions to be taken as necessary. Environmental monitoring will be conducted at each target hospital and AOM by an environmental manager (or *Regente Ambiental*) contracted by SESAL, and its results will be analyzed by the environmental manager and reported to SERNA by SESAL.

Table 1.16 Environmental Monitoring Plan

No.	Environmental Items	Item	Frequency	Responsible Organization	Cost
(5)	Noise and Vibration	Check the noise level	During sterilizer operation	SESAL	-
(7)	Bad Odor	Odor verification	During sterilizer operation	SESAL	-
(19)	Work Environment	Record of initial operation guidance Confirmation of safety measures such as wearing safety equipment, and O&M status	At the time of procurement of equipment At the time of soft component implementation	SESAL	Included in project costs
(20)	Accidents	Record of accidents	At the time of accident	SESAL	-

1.6 Points to Note for the Implementation of the Grant Aid Project

1.6.1 Clarification of the Section for Infectious Waste Management in SESAL

At the time of the Survey, the section responsible for monitoring the waste management discharged from medical facilities, including infectious waste, in SESAL has not yet been determined clearly. This is probably due to the lack of awareness of the importance of infectious waste management within SESAL and the lack of driving force towards its management. In order to properly operate and maintain the equipment procured by the Project, it is considered necessary to have a section in charge of managing the waste management status. Regarding the clarification of the section in charge, support for SESAL is planned in the soft component described later.

1.6.2 Collaboration between SESAL and the Associations of Municipalities

Since the target hospitals in the Project are under the management of SESAL, an agreement is not needed between the two parties regarding the use of the procured equipment in the hospital. On the other hand, the procured equipment for the AOMs will be used and maintained by the AOMs themselves under the lease from SESAL which is the responsible organization.

Therefore, it is necessary to exchange a lease agreement (*Contrato de Comodato*) between SESAL and AOMs. At the time of the Survey, the legal department of SESAL is preparing a draft document, which will be finalized after confirmation by the AOMs. SESAL and AOMs are required to establish a system for the O&M (personnel, budget, etc.) of procured equipment in accordance with the contract.

If the AOMs fail to properly operate the equipment, the procured equipment may be returned to SESAL.

1.6.3 Sustainable Charge Collection System by AOMs

To operate and maintain equipment and manage infectious waste sustainably, improvement of the charge collection system is suggested to secure the budget for the AOMs. The main points are set out below.

- Paying appropriate charges for the collection, processing, and disposal of infectious waste is the responsibility of healthcare institutions as the generators and as the management organization for infectious waste. It is therefore proposed to collect charges from those medical facilities for partial supplement of the equipment O&M cost.
- Municipalities can direct/order the method of collecting, treating and disposing of infectious waste to medical facilities, which are the generators. For example, the city of Puerto Cortes has issued a similar notice to hospitals in this city. Regarding tariff setting and other regulations for collection and treatment of infectious waste, member municipalities in Sensenti have specified in their municipal ordinances (or *Plan de Arbitrios*), and revisions are being considered when procuring

equipment by the Project. Since Mancurisj and Amuprolago do not currently collect charges from healthcare institutions for infectious waste collection, sharing information with Sensenti and proceeding with the revision of the ordinance are proposed.

- SESAL should manage to ensure as the responsible agency of the Project that hospitals thoroughly sort waste within the hospital and that municipalities notify the payment of collection charge.
- In addition, it would be an idea for SESAL to issue a notice regarding the payment of collection and disposal charges for infectious waste to medical facilities in the target AOM. SESAL is responsible for directing compliance with "Regulation for the Management of Infectious Hazardous Waste Generated from Healthcare Facilities (2008)" (hereinafter referred to as "*Regulamento 2008*") and has the authority as the regulatory authority for health care institutions in Honduras.
- On the other hand, even if the regulation is clear, there is a current situation where it is not complied with. Therefore, as a proposal, the separate collection and disposal of infectious waste should be included in the content of consignment work in the agreement (or *Convenio*) on primary medical services, which is concluded between SESAL and municipalities that are members of the AOM, and the amount of charge from SESAL to the municipalities are increased.

<Reference>

At present, SESAL of the prefecture entrusts the provision of primary medical services (emergency transportation, distribution of medicines, etc.) to the composed municipalities of Mancurisj, and they exchange agreements (*Convenio*) and renew them every year. The entrusted amount is "unit price per person multiplies by population".

This system may be spread not only in Mancurisj but also in other AOMs. However, there is a concern that the procedures etc. are to take time, other than Mancurisj which has already had the experience.

1.6.4 Approach to Medical Facilities by SESAL

In order to effectively utilize the equipment procured by the Project for infectious waste management in general, it is necessary for SESAL to reach out to medical facilities as shown below.

- In terms of hygiene management to prevent biohazards and effective use of procured equipment to prevent mixing of general waste, SESAL makes medical facilities aware of thorough separation of infectious waste and its responsibility.
- Since the waste management subcommittee to be set up in each medical facility aims to prevent biohazards related to hospital waste management, it is necessary for SESAL to appeal to each medical facility to make the committee function. The status of the establishment of the subcommittee will be monitored in the soft component of the Project.

CHAPTER 2. CONTENTS OF THE PROJECT

2.1 Basic Concept of the Project

2.1.1 Overall Goal and Project Objective

Overall Goal of the Project: To contribute to improving the sanitary environment in target hospitals and landfill sites, and preventing the risk of infection among medical personnel, waste management companies and local residents.

Project Objective: To aim to improve the implementation of the collection, transportation, treatment and final disposal of infectious waste as well as the management capacity of the implementing agencies by providing equipment to major hospitals and landfill sites in Honduras.

2.1.2 Outline of the Project

Based on the results of the Survey and in consultation with the Honduran side, the following project components are planned.

Table 2.1 Project Components

No.	Equipment	Quantity	Breakdown of the Target Facilities	
			Hospital	AOMs
Procurement of Equipment				
1	Sterilizers (50kg/1 cycle)	15	13	2
2	Transformer (30kVA or more)	13	11	2
3	Container (20ft)	15	13	2
4	Bulldozer (21t)	3	-	3
5	Excavator A (Bucket 0.8m^3)	2	-	2
6	Excavator B (Bucket 0.5m^3)	2	-	2
7	Pick-up Truck: 2,000~3,000cc)	4	1	3
8	Truck Scale (45t)	1	-	1
9	Waste Container and Cart	44	44	-
10	Weighing Scale	11	11	-
11	Repair Tool for Equipment (High-pressure washing machine and Air compressor)	2	-	2

Soft Component	
The goal of the Soft Component	To establish a sustainable O&M system for the procured equipment in SESAL and the target hospitals and AOMs, and to supervise and manage infectious waste in a safe and hygienic manner
Output 1:	Capacity and function to supervise infectious waste by SESAL is strengthened.
Output 2	The status of infectious waste management is grasped at the target hospitals, and appropriate O&M of procured equipment related to waste management is implemented.
Output 3	The status of infectious waste management by target AOMs is grasped, and appropriate O&M of procured equipment is implemented.

2.2 Outline Design of the Japanese Assistance

2.2.1 Design policy

(1) Basic Policy for Selection of the Project Area and the Equipment

The basic policies for the selection of the project area and equipment are described as follows:

- In selecting the equipment, the operation condition of the existing equipment and the capacity and achievements of the target institutions are surveyed and taken into consideration, and equipment that would enable sustainable maintenance is selected;
- To improve infectious waste management, detoxification equipment for hospitals are introduced. In addition, collection vehicles for infectious waste and heavy equipment for landfill sites for AOMs that are responsible for medical waste management in regional areas are considered;
- The implementing agency is the SESAL. Large national hospitals with more than 10,000 inpatients, 20,000 emergency patients, and 20,000 outpatients or hospitals in the two largest cities with large populations and the surrounding departments/health administrative regions (Francisco Morazán, Cortes, Tegucigalpa, and San Pedro Sula) are targeted, to which are added those recommended by SESAL, as they are large generators of infectious waste. Those hospitals that already have some processing system/equipment are excluded;
- For those AOMs, Sensenti/Guisayote, Mancurisj, and Amuprolago are selected with the conditions that they have established or are in the process of establishing an initiative for the collection and disposal of infectious waste under a regional waste management system led by the AOMs, and that they can secure a dedicated compartment for infectious waste at their disposal sites; and
- Ownership of all equipment will belong to SESAL, and SESAL will lease equipment to the AOMs based on an agreement (*Contrato de Comodato*) on the method and system of use, O&M and monitoring, etc. In case the AOMs fails to properly operate the equipment, possibility that the procured equipment will be returned to SESAL should be included in an agreement.

(2) Policies for Infectious Waste Management in Hospitals

The policies for infectious waste management in hospitals are as follows:

- From a hygienic standpoint, it is desirable for infectious waste to be detoxified within the hospital. However, many hospitals outsource the cleaning services including waste management to private companies that normally transport to the final disposal site without detoxification of infectious waste. By introducing sterilization equipment, the targeted hospitals enable to reduce the risks of biohazard from people who are handling the waste in the hospitals;
- Specifications for infectious waste treatment equipment (sterilizers) are selected in consideration of ease of O&M. Incinerators are excluded in the Project since they are expensive for O&M and their installation is likely to require an environmental impact assessment, consensus building with local residents and other processes which will take time before their installation;
- The required number of sterilizers is to be estimated with the amount of infectious waste discharged per day based on the results of the Survey of each target hospital, the number of hospital beds, the occupancy rate of hospital beds and the processing capacity of sterilizers;
- For the hospital that transports infectious waste on their own, efficient, effective and hygienic transport operations are considered by procuring the exclusive vehicles; and

- To grasp the amount of infectious waste generated in each hospital is important for evaluating the separation status of general waste and infectious waste, therefore a weighing scale is to be procured. Collection containers and transport carts are also procured to ensure efficient and safe collection and transportation of infectious waste.

(3) Policies for Infectious Waste Management in Associations of Municipalities

The policies for infectious waste management in the AOMs are as follows:

- While efforts are underway in the targeted AOMs to collect and transport infectious waste management by dedicated vehicles and to dispose it in separate compartments at the landfill site, the lack of equipment is preventing them from treating the increasing amount of infectious waste generated due to COVID-19. Therefore, vehicles for collection and transportation and heavy equipment for landfill management are procured;
- For Sensenti/Guisayote and Mancurisj, where small and medium-sized healthcare institutions are scattered and sterilization by themselves is difficult, sterilizers are to be installed for at the landfill site since it is efficient for the AOMs to put into one place and treat infectious waste generated in their sites;
- In order to systematically and properly landfill incoming waste, it is important to grasp the amount of waste delivered. Therefore, a truck scale is also to be procured in the landfill of Mancurisj which has not yet owned it;
- It is judged that a sterilizer is not necessary for Amuprolago, where the collected amount of infectious waste will be small;
- To efficiently collect and transport infectious waste, one pickup truck is to be procured for each AOM considering the narrow mountain roads and the loading capacity per truck; and
- For the landfilling operation, bulldozers and excavators are to be procured considering specifications based on the number and status of existing equipment.

(4) Policy on Procurement Condition

In Honduras, there are local agencies that have tie-ups with vehicle and construction equipment manufacturers in Japan and other countries, which sell, repair, and procure parts for equipment. Therefore, daily inspection and simple repair of equipment can be carried out by them without any problem. Repair for serious failures can be handled by dispatching engineers from overseas manufacturers and agencies that have signed an agreement with the local agencies. For the equipment to be procured in the Project, procurement countries and equipment manufacturers are considered that can procure spare parts etc. by the implementing agency through agencies.

(5) Policy on Utilization of Local Suppliers/Contractors

Local suppliers will be involved in the equipment procured in Honduras, as well as the other equipment, during the O&M period. In addition, local contractors will involve in the installation work of sterilizers which requires general electrical work and drainage work without special skills.

(6) Policy on Operation and Maintenance by the Implementing Agency

Guidance and capacity building for the proper O&M of the procured equipment are to be implemented through providing initial training and guidance on O&M of the equipment to the staff of the related agencies, implementation of maintenance contracts and soft components in the Project. It will result in establishment of ideal O&M system after the procurement is completed.

(7) Policy on the Soft Component

The policies on the soft component are as follows:

- In order to establish an appropriate and sustainable O&M system for the procured equipment (sterilizer) under the Project, guidance and assistance will be provided to the staff of SESAL, targeted hospitals and targeted AOMs regarding the improvement of O&M capability and the infectious waste management and supervision; and
- The GOH has instructed each hospital to develop an infectious waste management plan based on the amount of infectious waste generated by each hospital in accordance with the *Regulamento 2008*. To promote the proper implementation of this regulation, support and advice are implemented for measuring and monitoring the amount of infectious waste using the procured scales and developing a waste management plan based on the measured values.

(8) Policy on the Maintenance Contract

The policies on the maintenance contract are as follows:

- Since the sustainable O&M of the sterilizers is very important, which is the core of the Project and plays a central role in the infectious waste management, a two-year maintenance contract is set with the purpose of maintenance for a certain period and
- The contents of the maintenance contract are the regular inspection in Honduras for once every six (6) months and the necessary maintenance and repairs.

2.2.2 Basic Plan

(1) Equipment Plan for Hospitals

(a) Selection and Prioritization for Hospitals

As mentioned in the Basic Policy, targeted hospitals were selected from large national hospitals with more than 10,000 inpatients, 20,000 emergency patients, and 20,000 outpatients or hospitals in the two largest cities with large populations and the surrounding departments/health administrative regions (Francisco Morazán, Cortes, Tegucigalpa, and San Pedro Sula) with adding those recommended by SESAL, and a short list of 15 hospitals was prepared. Based on the results of visiting 15 hospitals on the shortlist, observing the status of infectious waste management in hospitals, and conducting interviews with related parties in the Survey, four (4) items such as the necessity of introducing detoxification treatment equipment, the organization (governance) of the hospital, the financial situation and the technical level were evaluated at each hospital (refer to Table 2.2). The summary of evaluation results is as follows:

- For six (6) of these hospitals (Nos. 5, 6, 8, 9, 11, and 12), the GOH (previous administration) has already installed a containerized ward and a set of medical equipment to accompany it in 2020 as a COVID-19 control measure, and autoclaves have already been procured among this equipment. However, the autoclaves have not been used in either hospital due to lack of training in their use and lack of manuals. The executing agency which was contracted to procure the containerized wards and equipment was found to have committed fraud, and the organization itself was abolished and is currently in dispute. Therefore, some hospitals have not even completed the handover procedures, and the future use of the equipment is still uncertain. Since the autoclaves installed here are intended to be used for the treatment of infectious waste generated in the wards and so the processing capacity is not sufficient. In addition, it is far from the intermediate temporary storage site, not suitable for the installation place. Detoxification treatment equipment for the infectious waste generated in the existing wards is necessary even if it becomes possible to use it.

- No. 12 Hospital Escuela Universitario was excluded from the Project since autoclaves for the treatment of medical waste are planned to be introduced with the support of UNDP.
- No. 13 Mario Mendoza and No.14 Hospital Psiquitario Santa Rosita are psychiatric hospitals and were excluded from the Project since they generate significantly less infectious waste.
- No. 15 Juan Manuel Gálvez has received an autoclave for the treatment of medical waste from the SESAL in 2016. Although this autoclave is broken, this is not used as it is almost new. So this hospital was excluded from the Project since it should be repaired and used at first (repair cost of about 400,000HNL).
- Therefore, the remaining 11 hospitals that were originally included in the shortlist were all targeted in the Project. If it becomes necessary to change the plan of the Project for some reason in the future, the Project will be changed according to the priority determined by each evaluation item.

Table 2.2 Results of Evaluation of Targeted Hospitals

No.	Hospital	Evaluation Item (Score: full-scale of 5)				Priority (Score)
		Necessity	Organization	Finance	Technology	
1	General San Felipe	Medium (3)	Medium (3)	Medium (3)	Medium (3)	7 (12)
2	INCP	Medium (3)	Excellent (5)	Good (4)	Excellent (5)	1 (17)
3	Puerto Cortés	Medium (3)	Relatively Poor (2)	Medium (3)	Relatively Poor (2)	10 (10)
4	Leonardo Martínez Valenzuela	Medium (3)	Excellent (5)	Good (4)	Good (4)	2 (16)
5	Mario Catarino Rivas	Medium (3)	Relatively Poor (2)	Excellent (5)	Excellent (5)	4 (15)
6	Gabriela Alvarado	Medium (3)	Medium (3)	Medium (3)	Medium (3)	7 (12)
7	Santa Bárbara	High (5)	Relatively Poor (2)	Relatively Poor (2)	Good (4)	5 (13)
8	General Atlántida	Medium (3)	Medium (3)	Medium (3)	Medium (3)	7 (12)
9	General San Francisco	High (5)	Medium (3)	Good (4)	Good (4)	2 (16)
10	Santa Teresa	Medium (3)	Medium (3)	Relatively Poor (2)	Relatively Poor (2)	10 (10)
11	Hospital Del Sur	Medium (3)	Medium (3)	Medium (3)	Good (4)	5 (13)
12	Hospital Escuela Universitario	Low (1)	Medium (3)	Excellent (5)	Excellent (5)	- (14)
13	Mario Mendoza	Low (1)	Medium (3)	Relatively Poor (2)	Relatively Poor (2)	- (8)
14	Hospital Psiquiatrico Santa Rosita	Low (1)	Relatively Poor (2)	Relatively Poor (2)	Medium (3)	- (8)
15	Juan Manuel Gálvez	Low (1)	Medium (3)	Relatively Poor (2)	Medium (3)	- (9)

Note: Gray hatches indicate hospitals excluded from the project.

(b) Evaluation Criteria

(i) Necessity

The necessity for the equipment was evaluated by the survey team based on the results of interviews at each hospital and the opinions of the hospital director, deputy director, or facility manager regarding the needs for detoxification equipment at the target hospital as presented in Table 2.3 below.

Table 2.3 Evaluation Criteria for Necessity

Evaluation Criteria	Evaluation Point
Improper final disposal (open dumping, open burning) is having a serious impact on the surrounding environment.	High (5)
Final disposal is being conducted at a municipal landfill.	Medium (3)
A detoxification equipment is scheduled to be installed, the facility can be used if repaired, or the amount of infectious waste generated is very small.	Low (1)

(ii) Organization

The number of staff per bed (the number of staff relative to the scale of the hospital) was regarded as the organizational strength of the hospital, and was judged as shown in Table 2.4.

Table 2.4 Evaluation Criteria for Organization

Evaluation Criteria (The number of staff per bed)	Evaluation Point
More than five (5) staffs/bed	Excellent (5)
More than three (3) staffs/bed	Good (4)
More than two (2) staffs/bed	Medium (3)
Less than two (2) staffs/bed	Relatively Poor (2)

(iii) Finance

Finance was evaluated by the average of O&M expenses as a percentage of the hospital's total budget for each year from 2018 through 2021 as shown in Table 2.5.

Table 2.5 Financial Evaluation Criteria

Evaluation Criteria (Average of O&M expenses as a percentage of the hospital's total budget)	Evaluation Point
More than 30%	Excellent (5)
25%～30%	Good (4)
20%～25%	Medium (3)
Less than 20%	Relatively Poor (2)

(iv) Technology

Technology was evaluated based on the composition and number of engineers involved in the O&M of the equipment since the main equipment to be installed is a sterilizer. The result of the evaluation is presented in Table 2.6.

Table 2.6 Evaluation Criteria for Technology

Evaluation Criteria (Composition and number of engineers for O&M of equipment)	Evaluation Point
Biomedical Technologist + Biomedical Technician + Electrical Technician	Excellent (5)
Biomedical Technologist + Engineer + Electrician	Excellent (5)
Biomedical Technician + Engineer + Electrician	Good (4)
Biomedical Technician + Electrical Technician	Good (4)
Biomedical Technologist + Biomedical Technician	Good (4)
Biomedical Technologist or Biomedical Technician + Engineer	Good (4)
Engineer + Electrician	Medium (3)
Electrician + Plumber + Welder + Operator	Medium (3)
Electrician + Plumber + Operator	Medium (3)
Electrician + Operator	Relatively Poor (2)
Electrician + Plumber	Relatively Poor (2)

(c) Specifications for Sterilizer

The specifications of the detoxification treatment equipment targeted in the Project were determined in the following flow. Based on the comparison results in Tables 1-11, a detailed comparison was conducted focusing on both autoclaves and microwaves as sterilizers.

(i) Introduction of Sterilizer Equipment in a Container

Generally, when ancillary equipment is installed with the sterilizer, it is better to install them in the same place considering the process flow. In case of installing sterilizers and ancillary equipment in the rooms of each hospital, it would be difficult to secure a new space for them. Moreover, since it will be complicated to connect to existing water supply and drainage facilities, all of this equipment is introduced into a container and its container will be installed outdoors near a temporary waste storage site.

Photo 2.1 Container-Type Sterilizer
Source: Matachana Home Page

If the container is installed outdoor space of the targeted hospital, its size will be 20 feet, which is possible to install for each hospital. When installing a set of sterilizers in the container, it is planned to equip a ventilation fan and a ventilation window inside the container.

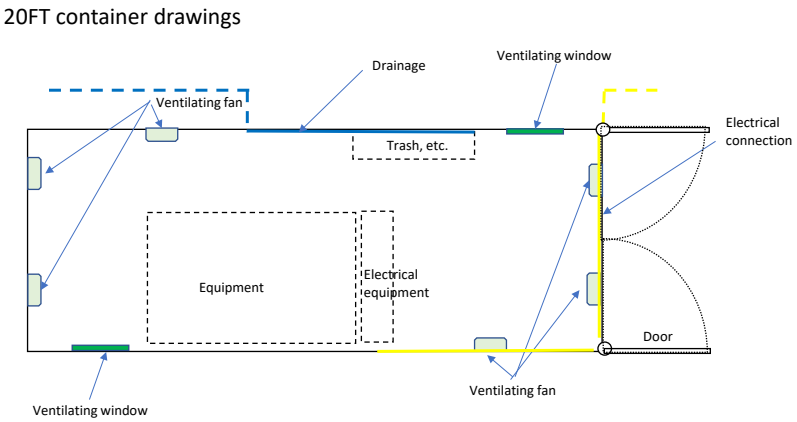


Figure 2.1 Plan of Inside the Container

The container will be installed outdoor of the target hospital, and since a horizontal and stable base foundation is necessary for the installation, foundation work with concrete will be carried out at all installation sites of sterilizers. This foundation work will be carried out by the Honduran side.

In addition, a transformer is required to be installed near the container to supply the power necessary to operate the sterilizer, and a low-voltage electricity is supplied to the inside of the container by pulling a wire from an external high-voltage wire through the transformer. Therefore, transformers will be procured in conjunction with container installation in the Project. The electrical work from the transformer to the inside of the container will be carried out by the Project, while the wiring from the external high-voltage power line will be carried out at all installation sites of sterilizers by the Honduran side.

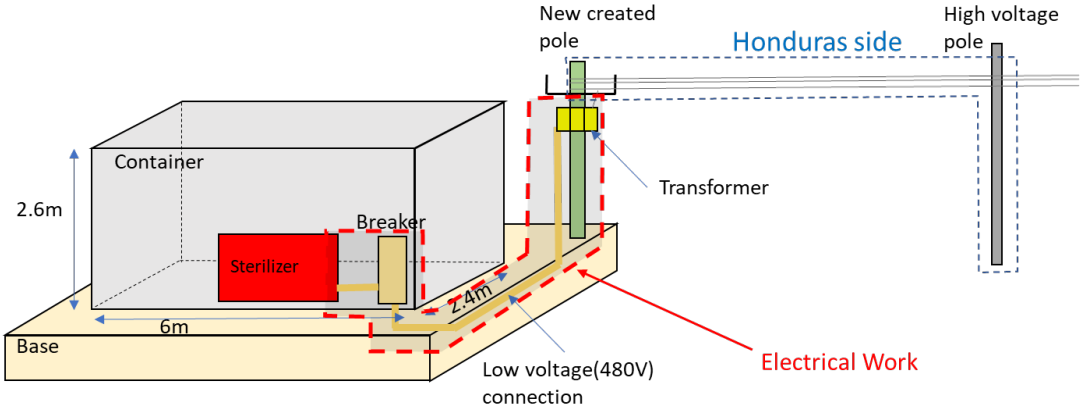


Figure 2.2 Schematic Image of the Electrical Work for the Container and Transformer

(ii) Treatment Capacity of the Sterilizer

Assuming that the sterilizer can be installed in a 20 feet container as mentioned above, a small and medium sized sterilizers with a processing capacity of around 50 kg/hour are targeted, which can obtain a certain processing capacity within the container.

Waste collected in the hospital is temporarily stored in a temporary storage area within the facility several times a day. Operation time of the sterilizer was set to 6 hours a day considering the time putting the waste into the equipment, taking out the treated waste and moving it to the general waste storage area. Equipment with a processing capacity of 50 kg/h is suitable for processing an assumed daily generation amount of 300 kg of waste.

(iii) Comparison of Sterilizers

To compare the specifications and maintenance of sterilizers, types of autoclave, microwave and friction heat were focused and detailed comparative inspection was conducted through web searching, emails, and telephone interviews.

a) Selection Criteria for Sterilizer

The targeted sterilizer is selected with the size that fits into the 20 feet container size, which is the sales package for microwaves and autoclaves. One with the size exceeded 20 feet size, including 40 feet container size, was excluded.

In addition, a processing capacity was set as approximately 50 kg/h. In case the sterilizer with a capacity of less than 50 kg/h per unit, the one which is with a capacity of 50 kg/h if multiple units are installed, was included in the selection process. In such cases, the equipment must be able to fit in a 20 feet container.

b) Equipment not Targeted

The microwave with over 20 feet size was excluded from the inspection since its height is higher than the container size and it is necessary to open the top of the 40 feet size, which means that it is necessary to build an additional building. In addition, the sterilizer which has a processing capacity of about 1 kg/h per unit was also excluded because this equipment needs to be introduced in large quantities per hospital.

The autoclaves that satisfy the processing capacity but do not satisfy the 20 feet container size (height) and are assumed to be difficult to work inside the container due to its long depth were excluded.

c) Result of Comparison

From the comparison results shown in Table 2.7, the autoclave was not adopted in the Project because of the high maintenance cost including the electricity and consumables and the complexity of ancillary equipment. Since it is difficult to be maintained, there is few possibility that the equipment will be operated continuously after the introduction as it looks like the other existing sterilizers that have been installed in the hospitals.

As the result of the comparison with the remaining two (2) products, i.e., microwave and friction heat, it was judged that microwave (high-frequency treatment) is more advantageous and it is then adopted as the sterilizer in the Project. This is because that the microwave has higher market share, less O&M costs, and easier O&M due to simple ancillary equipment compared with friction heat.

Table 2.7 Comparison of Sterilizer

Type	High Frequency Treatment (Microwave)	High Pressure and Steam Treatment (Autoclave)	Friction Heat Treatment
Treatment method	Thermal energy by high frequency	Thermal energy of high-temperature, high-pressure steam	Thermal energy by friction
Agency in Central America	Costa Rica, Panama	Honduras, neighboring countries	Honduras, Panama
Introduction achievement	Introduced in more than 55 countries including Central and South America	Honduras and other countries around the world	Introduced in more than 40 countries including Central and South America
Processing Capacity	About 50kg/1 hour	About 50kg/1 hour	About 30-40kg/30-40 minutes
Target treated waste (necessity of pretreatment)	Solids and liquids need not be separated and can be treated together	Depending on product	Since the liquid needs to be removed, it is necessary to separate it before inputting it.
Equipment (water supply and drainage)	Water supply/drainage; unnecessary or small amount even if necessary	Both water supply and drainage are required	Both water supply and drainage are required
ancillary equipment	Basically unnecessary	Boiler and water purifier are required. Odor control equipment depends on the product	Ventilation equipment/boiler may be required.
Initial cost	(Body price): Around 30-40 million JPY	(Body price): Around 40-50 million JPY Including ancillary equipment such as water purifiers and boilers	(Body price): Around 25-30 million JPY
Annual O&M Expenses	■Annual O&M cost (thousand JPY /unit) Electricity: 500 / Spare parts: 2,500 / Maintenance by Agency: 0 / Total: 3,000 <Electricity cost> 12kWh×6hr×3.43HNL/kWh×365days=90,140HNL (Proceeding 300kg/day = 50kg/h × 6 hours operation , Unit cost of electricity: 3.43HNL/kWh)	■Annual O&M cost (thousand JPY /unit) Electricity: 1,940 / Heat-resistant bag: 4,260 / Spare parts: 1,500 / Maintenance by Agency: 1,220 / Total: 8,920 <Electricity cost> 46kWh×6hr×3.43HNL/kWh×365days=345,548HNL (Proceeding 300kg/day = 50kg/h × 6 hours operation , Unit cost of electricity: 3.43HNL/kWh) < Heat-resistant cost> 5units×6cycle×365days×2.7USD=29,565USD (5 units are used per cycle, unit price: 2.70USD)	■Annual O&M cost (thousand JPY /unit) Electricity: 950 / Spare parts: 1,520 / Maintenance by Agency: 1,220 / Total: 3,690 <Electricity cost> 18kWh×7.5hr×3.43HNL/kWh×365days=169,013HNL (Proceeding 300kg/day = 40kg/h × 7.5 hours operation , Unit cost of electricity: 3.43HNL/kWh)
Maintenance	The person in charge at each hospital can handle daily parts replacement. Distributor engineers carry out important part replacements. There are few ancillary facilities, and there is little maintenance burden and failure risk.	It is carried out by distributor engineers. There are cases that it is not used since it is not repaired and the operation method is unknown in Honduras. Adding equipment such as water supply and drainage, boiler, etc. will increase the number of maintenance targets.	It is carried out by distributor engineers. Considering the situation of installation cases, it is easy for a malfunction to occur especially in water supply and drainage. Adding equipment such as water supply and drainage, ventilation, etc. will increase the number of maintenance targets.
Evaluation	・There are many introductive achievement and a large market share. ・The annual O&M cost consists of electricity and spare parts, and is the cheapest among the types. ・Since there is little ancillary equipment, the work related to water supply and drainage is minimal, and maintenance is easy. ・Maintenance can be carried out by the person in charge of each hospital, and there is little ancillary equipment, so there is little maintenance burden and failure risk.	・There are many introductive achievement in Honduras and other countries, and the market shares are large. ・The annual O&M cost consists of electricity, spare parts, maintenance costs, and is very high if expensive heat-resistant bags for heating are required. ・In addition to water supply and drainage facilities, ancillary facilities such as water purifiers and boilers are also required. Installation sites are limited due to the need for construction related to water supply and drainage. ・Since there are many ancillary facilities, maintenance is complicated and the risk of failure is not small.	・There are many introductive achievements, but there are a few market shares. ・The annual O&M cost consists of electricity, spare parts, and maintenance costs, which are higher than those for microwave. ・In addition to water supply and drainage equipment, ancillary equipment such as water purifiers and ventilation equipment may be required. Installation sites are limited due to the need for construction related to water supply and drainage. ・The maintenance of ancillary equipment becomes complicated, and the risk of failure is not small.
	○	△	△

Legend: ○: Highly recommended, △: Recommended
Remarks: Rates 1HNL=5.6 yen, 1USD=144 yen, 1€=138.23 yen

(d) Examination of Ancillary Equipment of the Sterilizer

A crusher is installed as an ancillary function of the sterilizer. By crushing the waste at the same time as the detoxification treatment, the treatment area of the waste is enlarged, and uniform treatment becomes possible. In addition, the volume of waste can be reduced, and treatment and transportation to the landfill site of the treated waste are to be easy and safe since sharp waste such as hypodermic needles can be eliminated.

Moreover, a water purifier is needed if the sterilizer requires water since the local water is hard water and the water quality is not good. However, the installation of a water purifier will require more adequate O&M, and the management will be complicated, so that a specification of the sterilizer should basically be set up so as not to require a lot of water.

(e) Quantity of Sterilizer

For the 11 hospitals targeted in the previous section, the quantity of sterilizers was determined according to the following conditions:

(i) Amount of Infectious Waste Generated in Each Hospital

Based on the data of each hospital owned by SESAL and the data surveyed by the infectious waste generation survey, the results of estimating the amount of infectious waste generated per day are shown in Table 2.8.

In the Survey, the infectious waste generation survey was conducted by the sub-contracting survey for eight (8) of the target hospitals in September 2022. As a result, the amount of infectious waste generated per bed was determined to be 1.89 kg/day, which was judged to be reasonable compared to the amount (1.43 kg/day, *SESAL, Programa Regional de Desechos Sólidos Hospitalarios Convenio ALA 91/33 "Regional Program on Medical Waste"*) estimated in a study on infectious waste management in Honduras in 1996. This amount was multiplied by the number of beds and bed occupancy in 2021 (2021 average) to arrive at the "estimated infectious waste volume kg/day".

At the same time, data on the amount of infectious waste discharged was collected from the questionnaire and interview from each hospital. The amount is estimated additionally based on the amount reported by the contractors to whom collection and final disposal are outsourced and the amount of bags collected during in-hospital collection or the amount loaded onto trucks, and the amount actually measured by a few hospitals. However, it was judged that these estimated amount is lack credibility, and therefore these data were only used as a reference in the Survey.

Table 2.8 Estimated Amount of Infectious Waste Generation from Each Hospital

No.	Name of Hospital	Department	Number of Beds (2021)[*1]	Bed Occupancy (2021 average)[*2]	Estimated Amount Generation kg/day	Amount Generation by the Interview kg/day[*3]
1	General San Felipe	Francisco Morazan	454	37%	**317.5**	512
2	INCP	Francisco Morazan	162	53%	**162.3**	130
3	Puerto Cortés	Cortes	161	101%	**307.3**	37[*6]
4	Leonardo Martínez Valenzuela	Cortes	143	100%	**270.3**	113
5	Mario Catarino Rivas	Cortes	870	60%	**986.6**	195
6	Gabriela Alvarado	Paraiso	198	84%	**314.3**	233
7	Santa Bárbara	Santa Barbara	141	63%	**232.2**	167
8	General Atlántida	Atlantida	243	85%	**390.4**	NA[*7]

No.	Name of Hospital	Department	Number of Beds (2021)[*1]	Bed Occupancy (2021 average)[*2]	Estimated Amount Generation kg/day	Amount Generation by the Interview kg/day[*3]
9	General San Francisco	Olancho	153	62%	**179.3**	112
10	Santa Teresa	Comayagua	210	57%	**226.2**	200
11	Hospital Del Sur	Choluteca	313	76%	**449.6**	370

Note: [*1] The numbers counted by SESAL. It is assumed that these numbers are equal to "Censable"(the numbers that were already secured space, equipmen, and staff) plus "No Censable" (the numbers that were temporarily secured space, equipment, and staff)
[*2] The numbers counted by SESAL.
[*3] Although this figure comes from the result of interview survey.

(ii) Required Capacity and Quantity of Sterilizer

The processing capacity of the sterilizer was set at 50 kg/h, and the daily processing capacity is set at 300 kg/day assuming that it operates for approximately six (6) hours a day. In addition, since the infectious waste generated in the hospital is mixed with general waste, due to promotion for separation, reduction of the volume by 80% are planned in the Project. Therefore, treatment capacity was calculated by multiplying 0.8 by the amount of infectious waste generated. As a result, the required number of sterilizers was calculated as total 13 as shown in Table 2.9.

Table 2.9 Required Quantity of Sterilizer for Each Hospital

No.	Hospital	Department	Treatment Capacity kg/day (a)	Estimated Amount Generation kg/day (b)	Treatment Amount kg/day (c) =(b) × 80%	Required Quantity (c)/(a)
1	General San Felipe	Francisco Morazan	300	317.5	254.0	1
2	INCP	Francisco Morazan	300	162.3	129.8	1
3	Puerto Cortés	Cortes	300	307.3	245.9	1
4	Leonardo Martínez Valenzuela	Cortes	300	270.3	216.2	1
5	Mario Catarino Rivas	Cortes	300	986.6	789.2	3
6	Gabriela Alvarado	Paraiso	300	314.3	251.5	1
7	Santa Bárbara	Santa Barbara	300	232.2	185.7	1
8	General Atlántida*	Atlantida	300	390.4	312.3	1
9	General San Francisco	Olancho	300	179.3	143.4	1
10	Santa Teresa	Comayagua	300	226.2	181.0	1
11	Hospital Del Sur*	Choluteca	300	449.6	359.7	1
Total					3,069	13

Note: *Although the treatment amount of these hospitals is larger than the treatment capacity, it will be able to treat all the waste by extending the operation time a little bit longer than ordinary 6 to 7 hours per day since the waste generation is merely estimated amount.

(f) Quantity of Container

The quantity of containers is set to one (1) for each sterilizer. Although two sterilizers can be installed in one (1) container, it would be difficult to secure sufficient space around the equipment for regular maintenance work after installation. Therefore, a total of 13 containers are procured in the hospitals considering ease of maintenance since the procured sterilizer is required to be properly maintained and managed and to maintain its function sustainably.

(g) Quantity of Transformer

Even if there are multiple sterilizers and containers, it is possible to perform transformation by installing one transformer. The required quantity of transformer in hospitals is therefore calculated at 11, which is the same as the number of target hospitals.

(h) Other Necessary Equipment for Hospitals

(i) Waste Containers and Carts in the Hospitals

Waste generated in the hospital is placed in small trash cans or bags in the room, collected in slightly larger containers and transported by cart to a temporary storage. Since there is a shortage of these containers and carts at each hospital and it is not possible to transport them hygienically from the hospital to the temporary storage site, four (4) sets of these containers and carts are procured per hospital.

(ii) Weighing Scale in the Hospitals

Since the quantitative understanding of the amount of waste generated in hospitals is not conducted in most hospitals, a scale to measure the amount of waste generated is procured and used to effectively implement infectious waste management. One (1) scale is procured per hospital.

(2) Equipment Plan for Associations of Municipalities

(a) Selection and Prioritization of Associations of Municipalities to be Assisted

The necessary equipment for the three AOMs, Sensenti/Guisayote, Mancurisj and Amuprolago, are procured since these AOMs seek to implement integrated administrative services from the collection and transportation of infectious waste to the final disposal. It is judged that support for the two AOMs of Sensenti/Guisayote and Mancurisj, which is already in the process of collecting, transporting and disposing of infectious waste, is a higher priority than Amuprolago, which is planned to be implemented in the future.

(b) Consideration of Specification and Quantity

(i) Specifications and Quantities of Equipment for the Landfill Operation

a) Bulldozer

A bulldozer is an indispensable equipment for the operation of a landfill site to level wastes and soil covering materials. It is also used daily at the landfill site managed by the AOMs and it is thought that continuous maintenance of equipment is possible. Therefore, it is judged that the procurement of bulldozers is appropriate.

Operation weight of 21t class is selected as a specification which is an appropriate size for the levelling and compacting waste since adequate compacting is very important to reduce the waste and to extend the life of landfill site.

Its quantity will be determined three (3) with the following reasons:

- One (1) bulldozer is procured in Sensenti/Guisayote as a renewal one since existing one is already used;
- One (1) bulldozer is procured in Mancurisj as a replacement of the rental one; and
- One (1) bulldozer is procured in Amuprolago on the existing landfill site.

b) Excavator

An excavator has a lot of usage such as levelling and transporting soil covering material, soil excavation and removal, loading of materials, and transportation of materials (crane transportation) of waste. Therefore, it is judged that the procurement of excavators is appropriate.

When examining the specifications and scale of the excavator, each class in Table 2.10 was considered based on the standard workload of the excavator.

Table 2.10 Classification of Excavator

Class	Standard workload*1 a	Production rate*2 b	Utilization rate c	Workload a × b × c
Bucket 0.8m^3 Operation weight: 21t class	540 m^3/day	75%	50%	116 m^3/day
Bucket 0.5m^3 Operation weight: 14t class	160 m^3/day	75%	50%	60 m^3/day

Note: *1 Refers to excavation loading amount of the excavator (Ministry of Land, Infrastructure, Transport and Tourism in Japan)
*2 Refer to the production rate of for general machinery work (Central and South America) in the JICA guideline.

Based on the amount of waste to be delivered to the landfill site according to the landfill site survey (sub-contracting survey) conducted in the Survey, the scale of exvators is shown in Table 2.11. Sensenti/Guisayote has a planned work volume of about 174m^3 per day, so 21t class was selected, which can work up to 233m^3. Mancurisj has a planned work volume of about 70m^3 per day, so 14t class was selected, which can work up to 120m^3 with two (2) units.

Since it is expected that small scale landfill sites will be integrated and consolidated in the future in Amuprolago, 21t class was selected, which is the standard specification for use at the landfill site.

Table 2.11 Result of the Inspection of Excavator's Specification

Item	Sensenti/Guisayote	Mancurisj
Planned Work Volume	174.4 m^3/day	70.4 m^3/day
- Amount of waste delivered (landfilled)	109 m^3/day	44 m^3/day
- Amount of soil covering (10% of landfilling volume)	10.9 m^3/day	4.4 m^3/day
- Embarkment etc. (50% of landfilling volume)	54.5 m^3/day	22 m^3/day
Selected excavator specifications	Bucket 0.8m^3 Operation weight: 21t class	Bucket 0.5m^3 Operation weight: 14t class
Maximum work volume per unit	116 m^3/day	60 m^3/day
Planned number of units in operation (including existing unit)	2 (existing: 1, new: 1)	2 (new: 2)
Maximum amount of work volume	233 m^3/day	120 m^3/day

Based on the above, at the Sensenti/Guisayote landfill site, one (1) excavator is added to the existing one, at the Mancurisj landfill site, two (2) excavators are to be replaced with rental machines, and at Amuprolagao, one (1) excavator is planned for the time being considering the use at the existing landfill site.

- Excavator A (Bucket capacity: around 0.8m^3): 2 units
- Excavator B (Bucket capacity: around 0.45m^3): 2 units

(ii) Specification and Quantity of Vehicles for Waste Collection and Transportation (including Hospital Use)

Vehicles for waste collection and transportation are procured for hospitals and AOMs for the purpose of transporting the infectious waste. As a vehicle, pick-up truck with a 4WD and enough loading capacity was adapted since it may run on narrow mountain roads.

Photo 2.2 Example of a Pickup Truck
Source: Complete Home Page

The specifications are determined under the following conditions and single cab pickup trucks were adapted.

- Estimated collection amount for each route: 800 kg
- Maximum load capacity: Set to more than 1,000 kg based on the weight of the loading body
- Required loading volume: 0.8 t ÷ specific gravity 0.15 (t/m^3) = 5.33 m^3 (about 5 m^3)

Table 2.12 Specifications of Pick-up Truck

Item	Selected Specification	Reason for Selection
Drive	4WD	Since the vehicle runs on a narrow mountain road, it should be a 4-wheel drive.
Body Size	Around 2000 × 1400 mm	Since each vehicle will carry about 1 ton infectious waste, the body size should be around 2,000 × 1,400 mm.
Body Shape	Van Body	To prevent from dropping the carrying waste on a mountain road, etc., covered and closed type are selected.
Riding Capacity	2 people	Since a driver and a loader will be ridden on the truck, single cabin is selected.

Since each local AOM does not own equipment for ifectious waste collection and transportation, one (1) unit each is procured to Sensenti/Guisayote, Mancurisj, and Amuprolagao. For hospitals, one (1) unit is procured to Santa Bárbara Hospital, which currently collects and transports waste on its own without outsourcing it to the private sector.

(iii) Specification and Quantity of Sterilizer

A set of sterilizer, transformer and container is procured to Sensenti/Guisayote and Mancurisj, where the status of the landfill site is clear.

(iv) Specification and Quantity of Truck Scale

A truck scale is procured for the purpose of measuring the weight of infectious waste delivered to a landfill site managed by the AOMs. However, the landfill site of Mancurisj is targeted, which does not currently have a truck scale, and the landfill site of Amuprolago is not covered, which will integrate and consolidate the several landfill sites in the future.

Table 2.13 Specification of Truck Scale

Item	Selected Specification	Reason for Selection
Maximum Measurement	Around 45t	Considering the maximum weight of a truck that is used at the site.
Platform Size	Around 6 m × 3 m	Considering the size of a truck that is used at the site
Measurement Method	Load Cell	It is the most common way to measure a truck and reliable.

(v) Tools for Maintenance

The minimum tools required for proper maintenance of equipment procured at the landfill site were selected as shown in Table 2.14 for the AOMs. Each set is procured to the two (2) AOMs of Sensenti/Guisayote and Mancurisj, where the landfill site status is clear.

Table 2.14 Specification of Tool for Maintenance

Items	Unit	Specifications
High-pressure washing machine	2	Engine type: >10.0 MPa
Air compressor	2	> 10 ps

2.2.3 Procurement Plan

(1) Policy on Procurement

(a) Basic Information

The Project is to be implemented under the Japan's Grant Aid Scheme. Products and services are to be procured under the Japanese grant aid for the development project agreed under the Exchange of Notes (hereinafter referred to as "the E/N") between the Government of Japan (hereinafter referred to as "GOJ") and the GOH, and the subsequent grant agreement (hereinafter referred to as "the G/A") concluded between the GOH and JICA. Roles of each party is given as follows:

- The GOJ shall supply the grant aid to the GOH in accordance with Japanese laws and regulations;
- JICA supplies the grant aid in accordance with Japanese laws and regulations within the agreement in the E/N on the basis of securement of justification of the Project and accountability of the grant aid;
- The GOH is responsible for implementation of the Project. As a client, the GOH shall provide necessary products and work force for the project implementation by using the grant aid from JICA;
- The Consultant is a private firm or a consortium responsible for design, cost estimate, tender, procurement, and construction supervision of the Project under the contract with the GOH; and
- The Supplier is a private firm or a consortium responsible for supply of necessary products and work force for the Project under the contract with the GOH.

(b) Implementation Framework by Honduran Side

The responsible agency for the Project is SESAL. For smooth implementation, SESAL shall coordinate and hold meetings with the Japanese Consultant and the Supplier, select the person in charge who understands the infectious waste management system and equipment, and implement the obligations of the Honduran side and the necessary measures to be taken by national agencies.

Under the supervision of SESAL, it is necessary for targeted hospitals and AOMs to understand the role of the procured equipment in the Project and to implement the Project smoothly. Therefore, the agreement between SESAL and each AOM and the agreement between SESAL and each hospital shall specify and agree on the relationship and responsibilities of the owners and users of the equipment.

(c) Consultant

In order to implement the procurement of equipment, the Consultant in Japan executes a contract with SESAL to carry out Detail Design and Procurement Supervision. In addition, the Japanese consultant will prepare the tender documents and carry out the tendering on behalf of SESAL.

(d) Supplier

The Japanese Supplier selected by open tender will be responsible for the procurement of equipment. The Supplier shall fully keep contact, arrange, and conduct the required repair and maintenance of the equipment after the completion of the Project.

(2) Procurement Condition

(a) Technical Transfer

Manufacturers of the procured equipment will provide initial operation guidance to engineers or staffs of the Honduran side (managers of hospitals and AOMs). In addition, sustainable and adequate O&M system will be formulated by conducting soft components to transfer technology for O&M after the procurement of equipment.

(b) Tax Exemption Procedures

Project objects are eligible for exemption of custom duties and consumption taxes. In addition, depending on the type of object, an application for an import license may be required.

(i) Custom Duty

In order to obtain exemption of custom duties, the following documents are needed to submit to the Ministry of Finance through SESAL:

- Publication in the Official Gazette
- Original invoice in USD
- Equipment list
- Certificate of origin
- Insurance documents

(ii) Consumption Tax

When purchasing goods for the Project in Honduras, the applicant must receive an invoice prior to payment and apply to the Ministry of Finance through SESAL for a consumption tax exemption permit with the necessary documents. The issued permit is handed over to the sales dealer, and the goods can be purchased with the sales tax exemption. Since Japanese companies have not obtained a tax registration number in Honduras, local dealers cannot issue invoices to Japanese companies. Japanese companies requiring obtaining consumption tax exemption must conclude an agency agreement with local dealers.

Documents to be submitted to the Ministry of Finance are an invoice, a copy of the local distributor agreement, a copy of the contract between SESAL and the Supplier and a copy of the G/A.

(iii) Application for Import Permission

Import of medical equipment may require an import permit from the *Agencia de Regulación Sanitaria* (hereinafter referred to as "ARSA"). SESAL shall apply the procedure for import permission to ARSA with the necessary documents.

(3) Scope of Works

The scope of works between the Japan side and the Honduran side is shown in Table 2.15. Procurement of equipment, transportation (including inland transportation), installation works, initial operation guidance, etc., will be implemented in the Project, and customs clearance procedures, tax exemption measures and securing of a storage site for procured equipment will be implemented by the Honduras side.

Table 2.15 Scope of Works and Responsibility

Item No.	Items	By the Project	By Honduran Side
1	Procurement of equipment	●	
2	Transportation from Japan, etc., to Honduras	●	
3	Customs clearance and tax exemption measures at the time of landing of equipment		●
4	Inland transportation from the port of unloading to the site	●	
5	Securing equipment storage site		●
6	Installation works of the procured equipment	●	
7	Initial operation guidance for procured equipment	●	

(4) Consultant Supervision

In compliance with the Japanese Grant Aid policy, the Honduran side shall contract with the Consultant recommended by JICA, and the Consultant shall implement detailed design (hereinafter referred to as "D/D") and procurement supervision.

The Consultant shall dispatch engineers in accordance with the progress of equipment inspection, initial operation guidance, etc., and shall implement safety management of the procurement. The personnel for procurement supervision of the Consultant is shown in Table 2.16.

Table 2.16 Consultant's Personnel for Procurement Supervision

Position	Q'ty	In charge	Duration
Chief Consultant	1	Comprehensive Project Management	Spot
Equipment Engineer	1	Equipment planning, reviewing the specification, etc.	Spot
Supervisor for Procurement	1	Supervision for arriving equipment and handover etc.	Spot
Engineer for Inspection	1	Inspection for Equipment	Spot

(5) Quality Control Plan

(a) Quality/Volume Management Plan

The Consultant shall carry out quality and volume supervision based on the following items for the quality and volume inspection specified in the contract document. As a result of confirmation and verification, when the quality and volume are not satisfied, the Consultant will immediately request the Supplier to make corrections and changes.

- Review of the production drawings and specifications of the equipment
- Witness of factory inspection and pre-shipment inspection
- Supervision of pre-shipment equipment conformity inspection by a third-party organization
- Verification of installation work, initial operation guidance, adjustment/test run, and operation guidance of procured equipment

(b) Process Control

The Consultant will require the Supplier to comply with the deadline specified in the contract and will supervise the monthly progress. When a delay of process is predicted, the Consultant reports to JICA, urges the Supplier to confirm and correct it, and requests the submission and implementation of countermeasures.

(6) Procurement Plan

(a) Country of Origin

The country of origin of equipment is as shown in Table 2.17.

Table 2.17 Country of Origin of Equipment

Item No.	Items	Q'ty	Country of Origin		
			Japan	Third Countries	Honduras
1	Sterilizer (50kg/h, including ancillary equipment)	15	○	○	
2	Transformer (37.5 kVA)	13			○
3	Container (20 ft)	15	○	○	
4	Bulldozer (21 t class)	3		○	
5	Excavator A (Backet 0.8 m^3)	2	○	○	
6	Excavator B (Backet 0.45 m^3)	2	○	○	
7	Pick-up Truck (2,000 – 3,000cc, with body work)	4	○	○	○
8	Truck Scale (45 t)	1		○	○
9	Waste Container and Cart	44	○		○
10	Weighing Scale	11	○		○
11	Repair Tool for Equipment (High-pressure washing machine and Air compressor)	2	○		

(b) Transportation Plan

Procured equipment will be shipped from Japan and/or third countries and landed at Puerto Cortés Port or San Lorenzo Port in Honduras. After Customs clearance, it will be transported to cities in Honduras and handed over to the Honduran side. Further, since the quantity of spare parts is small compared with the procured equipment body, they will be mounted on the equipment body.

For marine transportation, heavy machinery cannot be loaded onto container ships due to restrictions on vehicle width and vehicle height, so transportation by conventional ship or RORO ship will be applied, and the sterilizers are partially disassembled and transported by container. Regarding inland transportation in Honduras, the heavy machinery will be transported by trailer, and the others will be transported by container.

(c) Place for Hand-over and Storage of Equipment

The equipment procured in the Project will be handed over at the targeted hospitals and the AOMs in Honduras after unloading at Puerto Cortés Port or San Lorenzo Port. The equipment storage site will also be secured by the Honduran side.

(7) Initial Operational Guidance Plan

The adjustment and trial operation and initial operational guidance of equipment procured from Japan and the third counties are to be carried out by the engineers of each manufacturer of equipment. As work items, general inspection, panel operation inspection, operation confirmation, parts replacement, etc. are assumed. These works for equipment procured in Honduras are not to be carried out since they are already highly disseminated in Honduras.

(8) Soft Component Plan

The hospitals and the AOMs targeted in the Project do not have an experience of introducing detoxification treatment equipment for infectious waste. While some hospitals have equipment such as autoclaves for medical use, there is a fact that proper operation is not being carried out due to the shortage of consumables and budget etc. Therefore, in order to ensure appropriate O&M of the procured equipment in the Project, it is necessary to formulate a system that can implement sustainable O&M for procured equipment through the technical support for O&M system to hospitals and the AOMs such as developing manuals etc. in this soft component. Regarding the management of infectious waste, although there is a framework on the medical waste management system and regulation in Honduras, there is no awareness of the importance of infectious waste management in SESAL and the propellent force is lacking so that it is effective for proper O&M to incorporate the O&M function of the procured equipment into this framework.

Considering above, this soft component will establish a system that enables sustainable O&M of the procured equipment. The goal of the soft component was set as “To establish a sustainable O&M system for the procured equipment in SESAL and the target hospitals and AOMs, and to supervise and manage infectious waste in a safe and hygienic manner”. Outputs, activities and inputs of the soft component are shown in Table 2.18. Note that the soft component will not cover the equipment procured for the landfill operation (bulldozer and excavator etc.) since it is expected that they will be covered by a planned JICA technical cooperation project which aims to capacity development for general solid waste management.

Table 2.18 Soft Component Plan

Outcome	Activities	Input
<Output 1> Capacity and function to supervise infectious waste by SESAL is strengthened.	・To support for the preparation of document which shows the role of infectious waste management within SESAL including collaboration with the AOMs ・To prepare summary of the amount of infectious waste generated and the status of the infectious waste management plan of the target hospitals, and to provide advice on the establishment of its monitoring system ・To calculate of the necessary budget for the O&M of procured equipment and to summarize the budget data for the budget request documents ・To confirm and the contents of the private sector outsourcing and to prepare its revising idea	<Japanese Experts> ・Chief consultant: 1.00 MM ・Infectious waste management: 1.70 MM <Local staff> ・2.10MM

Outcome	Activities	Input
<Output 2> The status of infectious waste management is grasped at the target hospitals, and appropriate operation and maintenance of procured equipment related to waste management is implemented.	・To interview the establishment and operation status of the medical waste subcommittee and to prepare its summary ・To calculate and analyze the amount of infectious waste generated and to summarize the data of waste management flow ・To prepare a draft O&M manual for sterilizer and to conduct the guidance for its operation ・To prepare a draft inventory control document for consumables and spare parts of equipment	<Other> ・Interpreter ・Rental cars
<Output 3> The status of infectious waste management by target associations of municipalities is grasped, and appropriate operation and maintenance of procured equipment is implemented.	・To calculate and analyze the amount of infectious waste generated ・To prepare a draft O&M manual for sterilizer and to conduct the guidance for its operation ・To prepare a draft inventory control document for consumables and spare parts of equipment ・To confirm the status of guidance on separation, etc. to medical institutions where infectious waste is collected by the AOMs, and to propose its promoting	

(9) Implementation Schedule

The project implementation schedule is shown in Figure 2.3.

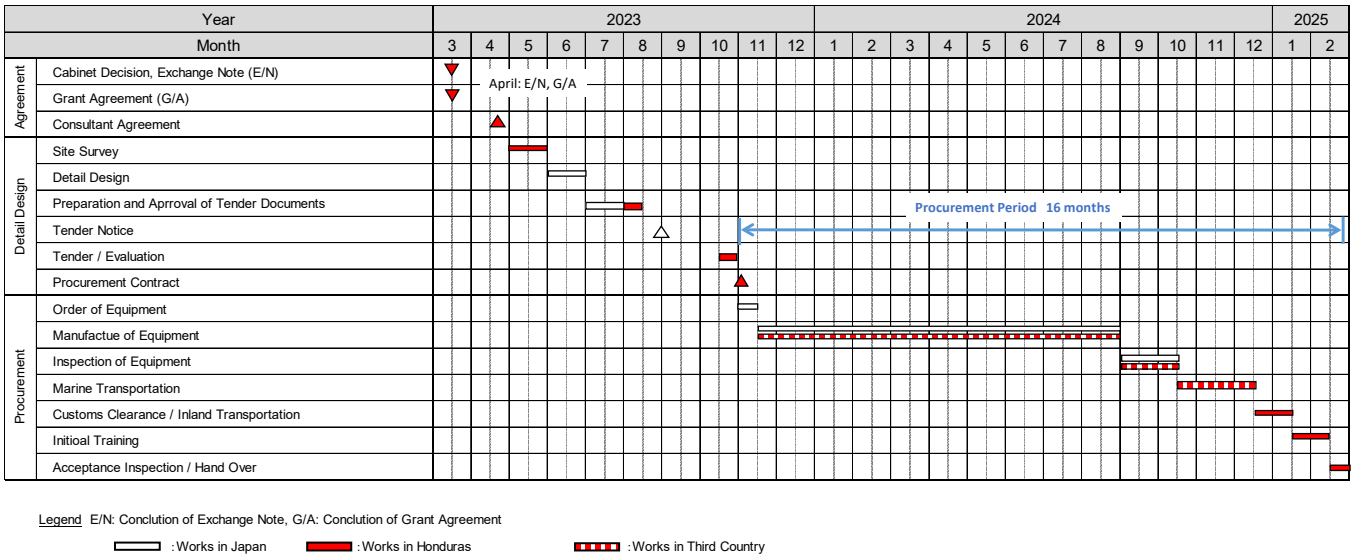


Figure 2.3 Project Implementation Schedule

2.3 Security Plan

According to the Ministry of Foreign Affairs of Japan, as of December 19, 2022, the general danger level of Honduras is mixed with “Level 1: Sufficient Caution” and “Level 2: Cancellation of non-essential travel”, and main city such as Tegucigalpa is set as level 2. While the cost of measures for special safety management is not considered in the Project, safety in the implementation of the Project is always considered and there is necessity to reflect the measures at the D/D stage, to implement the measures thoroughly and to change the plan flexibly as necessary in case the situation changes in the future. In the safety management of the Project, safety measures will be implemented in cooperation with the JICA Honduras Office.

2.4 Obligations of Recipient Country

2.4.1 Undertakings to be taken by the Honduran Side

The undertakings to be taken by the Honduran side for the implementation of the Project is shown in Table 2.19.

Table 2.19 Undertakings to be taken by the Honduran Side

No.	Items	Deadline	In charge
Before the Bidding			
1	To sign the banking arrangement (hereinafter referred to as "B/A") with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	SESAL/BCH
2	To issue Authorization to pay (hereinafter referred to as "A/P") to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	SESAL/BCH
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A	within 1 month after the signing of the contract(s) / every payment	SESAL/BCH
4	To secure space for installing/parking equipment	Before notice of the bidding documents	SESAL/AOMs
5	To clearly define the responsibilities between SESAL and AOMs through the signing of Memorandums of Understanding or other appropriate document	Before notice of the bidding documents	SESAL/AOMs
6	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	SESAL
During the Project Implementation			
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	SESAL/BCH
2	To bear the following commissions to the Agent Bank for the banking services based upon B/A	within 1 month after the signing of the contract(s) / every payment	SESAL/BCH
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	SESAL
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	SESAL
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted by its designated authority without using the Grant;	during the Project	SESAL
6	To obtain Environmental license for installation of sterilizing equipment	before the start of installation	SESAL
7	To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work	SESAL
8	To provide facilities necessary for the implementation of the Project outside the sites		

No.	Items	Deadline	In charge
	1) Electricity Installation of electricity distribution line to each required site	before start of the installation	SESAL/ AOMs
	2) Water Supply Installation of water distribution line to each required site	before start of the installation	SESAL/ AOMs
9	To take necessary measures for security and safety of the Project site	during the implementation	SESAL/ AOMs
10	To make necessary arrangement and bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the implementation	SESAL/ AOMs
11	To develop the monitoring format for periodical reporting operation and maintenance of equipment and materials used in AOMs to SESAL	before start of the installation	SESAL/ AOMs
After the Project			
1	To maintain and use properly and effectively the equipment provided under the Grant Aid	After installation of the equipment	SESAL/ AOMs
2	To report operation and maintenance of the equipment and materials in AOMs to SESAL based on the monitoring format as agreed (2)14	After installation of the equipment	AOMs

Note: BCH stands for Banco Central de Honduras.

2.4.2 Specific Undertakings to be Taken by the Honduran Side

(1) Works for the Set of Sterilizer (including Container and Transformer)

The container and transformer will be installed at the same space along with the installation of the sterilizer. Foundation work for a stable foundation of containers will be needed and carried out by the Honduran side. In addition, the Honduran side will also be responsible for the electrical work for wiring from the high-voltage power line to the transformer. Both works will be basically conducted at all installation sites (11 hospitals and 2 AOMs).

(2) Omission of Procedures for Obtaining the Environmental License for Sterilizer

As described in Subsection 1.5.3 , while it is obligatory to obtain an environmental license for operation management of the sterilizer, the procedure for obtaining this environmental license can be omitted with the agreement of the ministers of SESAL and SERNA. Therefore, SESAL will work with SERNA on the omission procedures regarding obtaining the environmental license.

(3) Responsibility of the AOMs for the O&M of Procured Equipment

The equipment procured for the AOMs will be used and maintained by the AOMs themselves under the lease from SESAL which is the responsible organization. SESAL and AOMs need to establish a system for O&M (including personnel, budget, etc.) of procured equipment in accordance with mutual contracts.

2.5 Project Operation Plan

2.5.1 Operation and Maintenance Plan in the Hospitals

(1) Operation and Maintenance System in the Hospitals

Each hospital has a technical and maintenance section (there are various names) that is responsible for the O&M of various equipment including medical equipment in the hospital. This section has hospital staffs or contractors who perform maintenance inspections and simple repairs of these equipment, although the number and specialization vary from hospital to hospital. It is planned that the equipment procured on the Project will also be operated and maintained under these existing systems.

Table 2.20 Current O&M System of Each Hospital

No.	Hospital	Department	Equipment	O&M section	Separation / Storage condition	Collection / Transportation
1	General San Felipe	Francisco Morazan	Sterilizer set: 1	Analysis and Management Department: 26	Separation and temporary storage	Outsourcing to private sector
2	INCP	Francisco Morazan	Sterilizer set: 1	General Service Department: 22	Separation and temporary storage	Outsourcing to private sector
3	Puerto Cortés	Cortes	Sterilizer set: 1	Maintenance Section: 2	Inadequate separation and temporary storage	Municipality
4	Leonardo Martínez Valenzuela	Cortes	Sterilizer set: 1	Maintenance Section:11	Inadequate separation and temporary storage	Outsourcing to private sector
5	Mario Catarino Rivas	Cortes	Sterilizer set: 3	Maintenance Department:20	Separation and temporary storage	Outsourcing to private sector
6	Gabriela Alvarado	Paraiso	Sterilizer set: 1	General Service Department :6	Separation and temporary storage	Outsourcing to private sector
7	Santa Bárbara	Santa Barbara	Sterilizer set: 1 Pick-up: 1	General Service Department :24	Inadequate separation and temporary storage	By own self
8	General Atlántida	Atlantida	Sterilizer set: 1	General Service Department :6	Inadequate separation and temporary storage	By own self
9	General San Francisco	Olancho	Sterilizer set: 1	Maintenance Section:4	Separation and temporary storage	Outsourcing to private sector
10	Santa Teresa	Comayagua	Sterilizer set: 1	Maintenance Section:3	Separation and temporary storage	Municipality
11	Hospital Del Sur	Choluteca	Sterilizer set: 1	Maintenance Section:13	Separation and temporary storage	Outsourcing to private sector

(2) Spare Parts and Others

Each hospital has a storage or a storage room to supplement spare parts for the equipment, so that parts and consumables can be supplied in a timely manner. These hospitals have an inventory system in place to record the entry and exit of items in the vault.

2.5.2 Operation and Maintenance Plan in the Associations of Municipalities

(1) Operation and Maintenance System in the Associations of Municipalities

The procured equipment (bulldozers, excavators, pick-up trucks, truck scales) is maintained by AOM's officials who can perform all maintenance work on heavy machinery. At present, the existing heavy equipment drivers are able to maintain and repair machinery easily, and often serve concurrently as mechanics, so the existing staff will be in charge of equipment maintenance as well.

Since each AOM will introduce new heavy machinery, operators for the new machinery are to be hired. These operators are capable of simple maintenance and repair of machinery, and many of them also serve as mechanics, so new mechanic is not to be hired. Heavy machinery is basically stored in the heavy equipment garage, and since a maintenance space is secured in the heavy equipment garage, daily inspection and repair work is carried out in this space.

Regarding collection vehicles, each municipality will introduce new collection vehicles, so an additional driver and collection worker are to be hired. The operation and maintenance of sterilizers shall be carried out by employing AOM's officials, including electricians, or contractor-based technicians.

Table 2.21 Current O&M System of Each AOM

No.	AOM	Implementing Body	Procured Equipment	O&M section	Additional Staff
1	Sensenti/ Guisayote	Territorio Valle de Sensenti S.A de C.V	Sterilizer set: 1 Bulldozer: 1 Excavator1: 1 Pick-up: 1	Total Staff: 14 Mechanic: 1 Operator: 5	Heavy machine operator: 2 Driver: 1 Collection worker: 1
2	Mancurisj	Project GIRS	Sterilizer set: 1 Bulldozer: 1 Excavator2: 2 Truck Scale: 1 Pick-up: 1	Staff: 5	Heavy machine operator: 3 Driver: 1 Collection worker: 1 Sterilizer worker: 1
3	Amuprolago	No body for the solid waste management	Bulldozer: 1 Excavator1: 1 Pick-up: 1	-	Heavy machine operator: 2 Driver: 1 Collection worker: 1

(2) Spare Parts and Others

Replacing parts and consumables within specified intervals is important for proper O&M of equipment. On the site of the office (at the landfill site) of the AOMs, there is a storage room to supplement spare parts, so this space is used. The management of these spare parts must be made possible by the introduction of an appropriate inventory system to provide parts and consumables in a timely manner. Technical assistance for the implementation and utilization of this inventory system also needs to be considered.

2.6 Project Cost Estimation

2.6.1 Initial Cost Estimation

(1) Initial Cost Borne by Japanese Side

The initial cost to be borne by Japanese side is not disclosed until the Supplier is selected.

(2) Initial Cost Borne by Honduran Side

The initial cost to be borne by Honduran side is as shown in Table 2.22.

Table 2.22 Initial Cost Borne by Honduran Side

Items	Amount (HNL)	Deadline
1) Banking fee to open a bank account for the Grant and commission for Authorization to Pay (A/P)	170,000	within 1 month after the signing of the Grant Agreement
2) Leveling and reclaiming the sites for Installation of Container for sterilizer	2,600,000	Before installation of equipment
3) Electrical work for sterilizers from the distributing line to the transformer of the Container*1	10,700,000	Before installation of equipment
4) On-site inspection Fee by DECA for the environmental license for the Sterilizer*2	70,000	After installation of the Sterilizer
Total	13,540,000	

Note: *1 Cost per location: 513,000HNL, on the assumption that the distance from electric lines to a transformer is to be 70m but as for Mancurisj, it is estimated at 620km. therefore, 513,000 × 12 + (513,000/70) × 620 = 10,700,000HNL
*2 Each USD 284 per the location except Tegucigalpa, where the Sterilizers are to be installed

2.6.2 Operation and Maintenance Cost

(1) O&M Cost for the Hospitals

(a) O&M Cost for Sterilizers

The main cost for O&M of the sterilizer is cost for electricity and spare parts & consumables.

The annual electricity cost for the 13 sterilizers installed in the hospital was calculated as follows:

Power consumption		Operating hours		Electricity cost		Days / Year		Q'ty		Annual Electricity cost
12kWh	×	6h/day	×	3.43HNL/kWh	×	365day	×	13	=	1,172 thousand HNL

- Power consumption: 12 kWh, based on interviews with manufacturers of the sterilizer
- Operating hours per day: 6 hours, considering the time for transporting the waste, etc.
- Electricity cost: 3.43HNL/kWh, at the time of field survey in August 2022

Also, it is necessary to replace consumables and spare parts such as crusher blades and airtight sealing materials for the sterilizer, and their cost is around 340 thousand HNL per year. Since a one-year manufacturer's warranty and a two-year maintenance contract will be implemented after the delivery of the equipment in the Project, expenses for these consumables will be needed from the third year after the delivery of the equipment.

(b) O&M Cost for Waste Collection and Transportation Vehicles

For Santa Bárbara Hospital, where one (1) collection/transport vehicle is planned to be procured, its fuel cost and maintenance cost are calculated below. Regarding personnel expenses, since the Santa Bárbara Hospital already has enough personnel, there is no need to hire new personnel and no additional costs will be required for it.

<Fuel Cost>

Trip distance		Fuel consumption		Fuel price		Number of trips		Weeks / year		Q'ty		Annual Fuel Cost
15.4km	÷	5.5km/L	×	34HNL/L	×	Twice/week	×	52 weeks	×	1	=	9,901HNL

- Trip distance: Round trip distances between hospital and landfill site (7.7km x 2)
- Fuel consumption: assumed at 5.5km per litter that is half of the official averaged rate of the same class of vehicle (11km/L) since the vehicle is driven on a mountain road with a load
- Fuel cost: Diesel, 34HNL/L, at the time of the field survey in August 2022
- Number of trips: 2 trips/week based on the amount of infectious waste generated per day at each hospital

<Maintenance Cost>

Assuming 10% of the fuel cost, 9,901HNL × 10% = 990HNL/year.

Based on the above, the O&M cost for collection and transportation vehicle at Santa Bárbara Hospital will be 10,891 HNL/year.

(c) O&M Cost for Each Hospital

The O&M cost for each hospital is summarized in Table 2.23.

Table 2.23 O&M Cost for Each Hospital

No.	Hospital	Department	Equipment (Quantity)	Operation and Maintenance Cost (Thousand HNL/year)
1	General San Felipe	Francisco Morazan	Sterilizer: 1	430
2	INCP	Francisco Morazan	Sterilizer: 1	430
3	Puerto Cortés	Cortes	Sterilizer: 1	430
4	Leonardo Martínez Valenzuela	Cortes	Sterilizer: 1	430
5	Mario Catarino Rivas	Cortes	Sterilizer: 3	430
6	Gabriela Alvarado	Paraiso	Sterilizer: 1	430
7	Santa Bárbara	Santa Barbara	Sterilizer: 1	430
			Vehicle: 1	11
Sub-Total				441
8	General Atlántida	Atlantida	Sterilizer: 1	430
9	General San Francisco	Olancho	Sterilizer: 1	430
10	Santa Teresa	Comayagua	Sterilizer: 1	430
11	Hospital Del Sur	Choluteca	Sterilizer: 1	430
Total			Sterilizer: 13 Vehicle: 1	5,590 11
Grand Total				5,601

(d) Estimation of the Reduction Amount for Outsourcing by Introduction of Sterilizer

When a sterilizer is introduced to each hospital, the treated infectious waste can be treated as general solid waste. In this case, it is no longer necessary to outsource the transportation of infectious waste by a special vehicle from the temporary storage site to the landfill site and its disposal at the landfill site to the private sector. The cost to be mitigated in this case is estimated as follows:

- Table 2.24 shows the private-sector consignment amounts for the 11 hospitals that plan to introduce sterilizers in the Project.

- Of these hospitals, seven (7) have private contracts, but only No.4 Leonardo Martínez Valenzuela Hospital outsources only the transport of infectious waste from the temporary storage site to the landfill site, and the rest all outsources a series of cleaning in the hospital, transportation of waste (general and infectious) generated in the hospital to the temporary storage site, and transportation of infectious waste to the landfill site.
- Therefore, when the sterilizer is introduced, the contract amount for No.4 Leonardo Martínez Valenzuela Hospital will be completely unnecessary.
- For the rest six (6) hospitals, since the cost of transporting the infectious waste from the temporary storage site to the landfill site is unknown in the contracting amount, this amount was calculated proportionally according to the scale of the hospital (number of beds) based on the cost of No.4 Leonardo Martínez Valenzuela's contract with the private sector, and this amount was used as the reduced cost of the contract with the private sector due to the introduction of the sterilizer.
- As a result of the above calculation, 3,848 thousand HNL per year will be reduced as the reduced contract cost of 11 hospitals.
- This amount is around 69% of the additional O&M cost of 5,601 thousand HNL when introducing the sterilizers shown in the previous section, and the introduction of the sterilizer will contribute to reducing the part of the financial burden of the SESAL in terms of cost.
- As for Puerto Cortes, although it is currently collected by the municipality, in accordance with the *Regulamento 2008*, a notice has been issued by the municipality to entrust the collection, treatment and disposal to INSERMASA, a private contractor, and to pay the cost from the hospital since September 2022. This hospital should outsource the service to the private sector, but if sterilizer is introduced, this cost will also be unnecessary.

Table 2.24 The Present Contract Amount Paid to Private Companies

Name of Hospital	Number of Beds	Contract Amount (HNL)	Reduction Amount by the introducing the Sterilizer (HNL)
General San Felipe	454	24,456,533	761,958
INCP	162	12,558,000	271,888
Puerto Cortes	161	Collection by the Municipality	
Leonardo Martínez Valenzuela	143	240,000[*1]	240,000
Mario Catarino Rivas	870	40,650,660[*2]	1,460,140
Gabriela Alvarado	198	5,989,200	332,308
Santa Bárbara	141	Transportation by themselves	
General Atlántida	243	Collection by the Municipality	
General San Francisco	153	8,211,000	256,783
Santa Teresa	210	Collection by the Municipality	
Hospital Del Sur	313	11,903,880	525,315
Total		**103,769,273**[3]	**3,848,392**

Note: [*1] This hospital has contracted directly with a private company to transport infectious waste from a temporary storage to a final disposal site at the monthly cost of 20,000HNL.
[*2] The original contract was 30,487,995HNL for 9 months, so it converts to 12-month cost.

(2) O&M Cost for the Associations of Municipalities

(a) Landfill Site in Sensenti/Guisayote

The O&M costs for the Sterilizer, Bulldozer, Excavator A and Pick-up truck to be procured for the landfill site at the Sensenti/Guisayote are calculated as follows:

(i) O&M Cost of the Equipment for the Landfill Operation

Regarding the equipment for the landfill operation (Bulldozer, Excavator A), the costs for fuel, maintenance and additional personnel (operator) are required, and the total amount is calculated below. Detail calculations are shown in Table 2.25 and Table 2.26.

Sensenti/Guisayote
Equipment Expenses: Annual fuel cost + Annual maintenance cost 1,383 thousand HNL/year
Additional Labor Cost: Operator (Mechanic) =476 thousand HNL/year
Total Cost = 1,859 thousand HNL/year

Table 2.25 Annual Cost of Fuel and Maintenance of Equipment for Landfill Site at Sensenti/Guisayote

Heavy Equipment	unit	Equipment Basic Unit Price*3		Fuel Consumption Rate (L/h)*3	Operating hours (h/day) *4	Operation Day (day)	Annual Fuel Cost*1 (HNL)	Annual Maintenance Cost*2 (HNL)
		JPY	HNL					
Bulldozer	1	28,200,000	4,732,258	23	3	260	610,000	237,000
Excavator A	1	13,300,000	2,231,881	16	3	260	424,000	112,000
						Sub-total	1,034,000	349,000
Annual necessary expenses for landfill site maintenance								**1,383,000**

Note: *1 Annual fuel cost: number of units × operating hours ×operating days × fuel consumption rate × fuel cost (Diesel 34HNL/L)
*2 Annual maintenance cost: 5% of basic unit price of equipment, Cost of truck scale is 1,500USD/time and calibration fee twice a year
*3 Equipment basic unit price, fuel consumption rate: referred to Construction machinery loss (Japan Construction Machinery Construction Association)
*4 Operating hours and operating days: Utilizing the results of the landfill site survey in the Survey

Table 2.26 Labor Cost for Equipment for Landfill Site at Sensenti/Guisayote

Additional Staff	Monthly Rate	Annual Rate*	Q'ty	Labor Cost
Operator for heavy machine (Mechanic)	17,000 HNL	238,000 HNL	2	476,000 HNL

Note:* Annual rate was calculated based on 14 month rate in accordance with the convention in Honduras (One month is paid additionally in June and December). Hereinafter, the calculation is made in a same manner.

(ii) O&M Cost for Pick-up Truck

O&M costs for the Pick-up Truck in Sensenti/Guisayote are shown in Table 2.27. It is assumed that the annual maintenance cost will be approximately 435 thousand HNL.

Table 2.27 Labor Cost for Pick-up Truck at Sensenti/Guisayote

Additional Staff	Monthly Rate	Annual Rate	Q'ty	Labor Cost
Driver	15,000 HNL	210,000 HNL	1	210,000 HNL
Loader	12,500 HNL	175,000 HNL	1	175,000 HNL
Total				385,000 HNL

<Fuel Cost>

Trip distance		Fuel consumption		Fuel price		Number of trips		Weeks / year		Q'ty		Annual Fuel Cost
70 km	÷	5.5km/L	×	34HNL/L	×	Twice/week	×	52 weeks	×	1	=	45,000HNL

- Trip distance: About 70 km from the collection/transportation route (there are 3 routes) from the target hospital (clinic/health center) to the landfill site (by interviewing)
- Fuel consumption: assumed at 5.5km per litter that is half of the official averaged rate of the same class of vehicle (11km/L) since the vehicle is driven on a mountain road with a load
- Fuel cost: Diesel, 34HNL/L, at the time of field survey in August 2022
- Number of trips: 2 trips/week based on the result of the landfill survey in the Survey

<Maintenance Cost>

Assuming 10% of the fuel cost, 45,000 HNL × 10% = 4,500 HNL/year.

(iii) O&M Cost for Sterilizer

The O&M cost of the sterilizer is electricity cost calculated as follows:

Power consumption		Operating hours		Electricity cost		Days / Year		Q'ty		Annual Electricity cost
12kWh	×	6h/day	×	3.43HNL/kWh	×	156 days	×	1	=	39 thousand HNL

- Power consumption: 12 kWh, based on interviews with manufacturers of the sterilizer
- Operating hours per day: 6 hours, considering the time for transporting the waste, etc.
- Electricity cost: 3.43HNL/kWh, at the time of field survey in August 2022
- Number of days per year: Assuming operation 3 times a week (3 times/week × 52 weeks)

In addition, since the operating rate of the sterilizers of each AOM is expected to be about 40% of that of sterilizers operating in the hospitals, the cost of consumables and spare parts will be 140 thousand HNL per year.

Therefore, the O&M cost of the sterilizer will be 179 thousand HNL per year.

(b) Landfill Site in Mancurisj

The O&M costs for the Sterilizer, Bulldozer, Excavator B, Truck Scale and Pick-up truck to be procured for the landfill site at the Mancurisj are calculated as follows:

(i) O&M Cost of the Equipment for the Landfill Operation

Regarding the equipment for the landfill operation (Bulldozer, Excavator B, Truck Scale), the costs for fuel, maintenance and additional personnel (operator) are required, and the total amount is calculated below. Detailed calculations are shown in Table 2.28 and Table 2.29.

Mancurisj

Equipment Expenses: Annual fuel cost + Annual maintenance cost 1,354 thousand HNL/year

Additional Labor Cost: Operator (Mechanic) =756 thousand HNL/year

Total Cost = 2,110 thousand HNL/year

Table 2.28 Annual Cost of Fuel and Maintenance of Equipment for Landfill Site at Mancurisj

Heavy Equipment	unit	Equipment Basic Unit Price*3		Fuel Consumption Rate (L/h)*3	Operating hours (h/day) *4	Operation Day (day)	Annual Fuel Cost*1 (HNL)	Annual Maintenance Cost*2 (HNL)
		JPY	HNL					
Bulldozer	1	28,200,000	4,732,258	23	4	156	488,000	237,000
Excavator B	2	8,310,000	1,394,506	9.8	4	156	416,000	139,000
Truck Scale		N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	74,000
						Sub-total	904,000	450,000
						Annual necessary expenses for landfill site maintenance		**1,354,000**

Note: *1 Annual fuel cost: number of units × operating hours × operating days × fuel consumption rate × fuel cost (Diesel 34HNL/L)
*2 Annual maintenance cost: 5% of basic unit price of equipment, Cost of truck scale is 1,500USD/time and calibration fee twice a year
*3 Equipment basic unit price, fuel consumption rate: referred to Construction machinery loss (Japan Construction Machinery Construction Association)
*4 Operating hours and operating days: Utilizing the results of the landfill site survey in the Survey

Table 2.29 Labor Cost for Equipment for Landfill Site at Mancurisj

Additional Staff	Monthly Rate	Annual Rate*	Q'ty	Labor Cost
Operator for heavy machine (Mechanic)	18,000 HNL	252,000 HNL	3	756,000 HNL

(ii) O&M Cost for Pick-up Truck

O&M costs for the Pick-up Truck in Mancurisj are shown in Table 2.30. It is assumed that the annual maintenance cost will be approximately 232 thousand HNL.

Table 2.30 Labor Cost for Pick-up Truck at Mancurisj

Additional Staff	Monthly Rate	Annual Rate	Q'ty	Labor Cost
Driver	12,000 HNL	168,000 HNL	1	168,000 HNL
Loader	3,000 HNL	42,000 HNL	1	42,000 HNL
Total				210,000 HNL

<Fuel Cost>

Trip distance		Fuel consumption		Fuel price		Number of trips		Weeks / year		Q'ty		Annual Fuel Cost
62 km	÷	5.5km/L	×	34HNL/L	×	Once/week	×	52 weeks	×	1	=	20,000HNL

- Trip distance: About 62 km from the collection/transportation route (there are 3 routes) from the target hospital (clinic/health center) to the landfill site (by interviewing)
- Fuel consumption: assumed at 5.5km per litter that is half of the official averaged rate of the same class of vehicle (11km/L) since the vehicle is driven on a mountain road with a load
- Fuel cost: Diesel, 34HNL/L, at the time of field survey in August 2022
- Number of trips: 1 trip/week based on interviewing in the Survey

<Maintenance Cost>

Assuming 10% of the fuel cost, 20,000 HNL × 10% = 2,000 HNL/year.

(iii) O&M Cost for Sterilizer

The O&M cost of the sterilizer is 179,000 HNL as well as Sensenti/Guisayote. In addition, since Mancurisj does not have dedicated engineers, it plans to hire engineers three times a week at 400HNL/day.

- 400 HNL/day × 3 times/week × 52 weeks = 62,000 HNL/year

Therefore, the O&M cost and additional labor costs will be 241 thousand HNL.

(c) Landfill Site in Amuprolago

The O&M costs for the Sterilizer, Bulldozer, Excavator A and Pick-up truck to be procured for the landfill site at the Amuprolago are calculated as follows.

(i) O&M Cost of the Equipment for the Landfill Operation

Regarding the equipment for the landfill operation (Bulldozer, Excavator A), the costs for fuel, maintenance and additional personnel (operator) are required, and the total amount is calculated below. Detail calculations are shown in Table 2.31 and Table 2.32.

Amuprolago
Equipment Expenses: Annual fuel cost + Annual maintenance cost 1,383 thousand HNL/year
Additional Labor Cost: Operator (Mechanic) =504 thousand HNL/year
Total Cost = 1,887 thousand HNL/year

Table 2.31 Annual Cost of Fuel and Maintenance of Equipment for Landfill Site at Amuprolago

Heavy Equipment	unit	Equipment Basic Unit Price*3		Fuel Consumption Rate（L/h）*3	Operating hours（h/day）*4	Operation Day (day)	Annual Fuel Cost*1 (HNL)	Annual Maintenance Cost*2 (HNL)
		JPY	HNL					
Bulldozer	1	28,200,000	4,732,258	23	3	260	610,000	237,000
Excavator A	1	13,300,000	2,231,881	16	3	260	424,000	112,000
						Sub-total	1,034,000	349,000
						Annual necessary expenses for landfill site maintenance		**1,383,000**

Note: *1 Annual fuel cost: number of units × operating hours ×operating days × fuel consumption rate × fuel cost (Diesel 34HNL/L)
*2 Annual maintenance cost: 5% of basic unit price of equipment, Cost of truck scale is 1,500USD/time and calibration fee twice a year
*3 Equipment basic unit price, fuel consumption rate: referred to Construction machinery loss (Japan Construction Machinery Construction Association)
*4 Operating hours and operating days: Utilizing the results of the landfill site survey in the Survey

Table 2.32 Labor Cost for Equipment for Landfill Site at Amuprolago

Additional Staff	Monthly Rate	Annual Rate*	Q'ty	Labor Cost
Operator for heavy machine (Mechanic)	18,000 HNL	252,000 HNL	2	504,000 HNL

(ii) O&M Cost for Pick-up Truck

O&M costs for the Pick-up Truck in Amuprolago are shown in Table 2.33. It is assumed that the annual maintenance cost will be approximately 406 thousand HNL.

Table 2.33 Labor Cost for Pick-up Truck at Amuprolago

Additional Staff	Monthly Rate	Annual Rate	Q'ty	Labor Cost
Driver	18,000 HNL	252,000 HNL	1	252,000 HNL
Loader	2,000 HNL	28,000 HNL	1	28,000 HNL
Total				280,000 HNL

As of the time of the field survey in August 2022, the landfill site of Amuprolago has not yet been determined. Therefore, it is assumed that the Taulabe landfill site is basically used, and the waste will be collected along Route 20 from Gualala City and two routes from Las Vegas City to the Taulabe landfill site via Routes 54, 45 and 5. The total of the two routes is 355km. Assuming that each collection is done once a week, the annual fuel cost is as follows:

<Fuel Cost>

Trip distance		Fuel consumption		Fuel price		Number of trips		Weeks / year		Q'ty		Annual Fuel Cost
355 km	÷	5.5km/L	×	34HNL/L	×	Once/week	×	52 weeks	×	1	=	114,000HNL

- Fuel consumption: assumed at 5.5km per litter that is half of the official averaged rate of the same class of vehicle (11km/L) since the vehicle is driven on a mountain road with a load
- Fuel cost: Diesel, 34HNL/L, at the time of field survey in August 2022

<Maintenance Cost>

Assuming 10% of the fuel cost, 114,000 HNL × 10% = 11,400 HNL/year.

(d) O&M Cost for Each Association of Municipalities

Table 2.34 summarizes the O&M costs of the equipment of each AOM. Sensenti/Guisayote will require additional annual operation and maintenance fees a total 2,473 thousand HNL, Mancurisj will require a total of 2,583 thousand HNL and Amuprolago will require a total of 2,293 thousand HNL.

Table 2.34 Operation and Maintenance Cost for Each AOM

No.	AOM	Equipment	O&M Cost (Thousand HNL/year)
1	Sensenti/Guisayote	Heavy Machine	1,859
		Vehicle	435
		Sterilizer	179
Sub-Total			2,473
2	Mancurisj	Heavy Machine	2,110
		Vehicle	232
		Sterilizer	241
Sub-Total			2,583
3	Amuprolago	Heavy Machine	1,887
		Vehicle	406
Sub-Total			2,293
Total		Heavy Machine Vehicle Sterilizer	5,856 1,073 420
Grand Total			**7,349**

CHAPTER 3. PROJECT EVALUATION

3.1 Preconditions

Preconditions for the implementation of the Project are to ensure that the following undertakings are implemented by the Honduran side:

- Obtaining an environmental license for the O&M of the sterilizer;
- Implementation of tax exemption procedures without delay;
- Securing the installation and storage of the procured equipment;
- Securing O&M costs; and
- Securing human resources for O&M.

3.2 Necessary Inputs by Recipient Country

The following items must be addressed by the Honduran side for the project to be effective and sustainable:

- The procured equipment will be properly allocated and operated;
- The necessary personnel and budget for O&M of the procured equipment will be secured; and
- Thorough regular inspections of procured equipment, O&M and management of spare parts are to be properly carried out.

3.3 Important Assumptions

The important assumptions for the project implementation are as follows:

- No major policy changes in the health administration and infectious waste management system in Honduras; and
- No major changes in the operation of the landfill site owned by the AOMs including the closure of the landfill site.

3.4 Project Evaluation

3.4.1 Relevance

(1) Urgency

In Honduras, the spread of COVID-19 infection has led to a rapid increase in infectious waste such as personal protective equipment (masks, gowns, etc.) and syringes and needles generated by vaccination. Infectious wastes are stored, collected and transported mixed with general wastes without being separated, and there is concern about the risk of secondary infection to medical workers, waste management workers and nearby residents. Therefore, there is a need to urgently reduce the risk of secondary infection through the implementation of the Project.

(2) Consistency with National Policy

The Honduran government has established the "Guidelines for the Proper Management of Sanitation and Solid Waste under Emergency Situations of the Spread of COVID-19" (SERNA, 2020), and has identified the achievement of separate collection and appropriate detoxification treatment of infectious waste as a high priority project. The Project aims to achieve the separate collection and

appropriate detoxification of infectious waste through the procurement of sterilizers and other equipment for 11 hospitals and three AOMs in Honduras.

(3) Consistency with Cooperation Policies of Japan and JICA

Japan has positioned the cooperation program “Program for Strengthening Social Services” in the priority area of "Rural Development in its Country Development Cooperation Policy for the Republic of Honduras” (June 2021). In addition, in the JICA Country Analysis Paper for the Republic of Honduras (March 2020), “diffusion of quality social services” was analyzed as a development issue. Furthermore, JICA's Global Agenda includes the “JICA Global Healthcare Initiative” to strengthen the response to public health crises such as COVID-19 and promote the creation of systems to protect the health that is the foundation of people's lives, and the “JICA Clean City Initiative” to promote proper waste management and realize healthy and safe lifestyles. The Project contributes significantly to the realization of these cooperative policies and analyses, etc., by procuring equipment to improve the management of infectious waste.

3.4.2 Effectiveness

(1) Quantitative Evaluation

As an indicator of the quantitative effect of the Project, the “Amount of infectious waste sterilized at medical institutions” is set as shown in Table 3.1.

Table 3.1 Quantitative Effect Indicators and Target Values

Index Name	Base Value (Actual value in 2021))	Target Value (in 2028) Three years after completion of the Project
Amount of infectious waste sterilized at medical institutions (kg/day)	0	2,585

Note: The amount of infectious waste that is sterilized by the sterilizers in the 11 hospitals to be supported.

(2) Qualitative Effects

The qualitative effects of the Project are as follows:

- Strengthening of the system for separate collection and transport of infectious waste and management of landfill sites in 21 municipalities in the rural areas that compose the AOMs;
- Strengthening of the system of separate storage and collection of infectious wastes at national and public hospitals; and
- Reduction of the risk of waste-derived infectious diseases among healthcare workers, waste-related workers and waste pickers at landfill sites in the target areas.

3.5 Monitoring Plan for the Project

Table 3.2 shows the monitoring plan for measuring the above project effects of the Project.

Table 3.2 Monitoring Plan of the Project

Category	Item	Method	Schedule	Implementing Agency
Evaluation Item	Amount of infectious waste sterilized	Measure and save records as the following manner: This is also followed by the soft component. Hospital: Measurement using the weighing scale AOM: Measurement based on the amount of delivered waste at the landfill	After equipment procurement When using the sterilizer	Hospital and AOM introducing the sterilizer Supervision by SESAL Support by the Consultant (soft component)
	Separate storage and collection system for infectious waste in hospitals	The target hospital will organize the situation and report to SESAL, which supervises those situations.	After equipment procurement Approx. once/month	SESAL Hospital
	Management system for separate collection and transportation of infectious waste and final disposal site by AOM	The target AOM will organize the situation and report to SESAL, which supervises those situations.	After equipment procurement Approx. once/month	SESAL AOM
Organization of SESAL	Role of the section for infectious waste management in SWSAL	The department in SESAL responsible for infectious waste management is identified and ensured by documentation. This is also followed by the soft component.	During the Project including soft component period	SESAL Support by the Consultant (soft component)
	Securing financial resources for equipment O&M cost	Based on the information from the target hospitals, the O&M cost of the procured equipment will be estimated and budgeted accordingly. This is also followed by the soft component.	After equipment procurement once/year	SESAL Hospital Support by the Consultant (soft component)
Organization of AOM	Contract for use of procured equipment with SESAL	The contract conclusion and renewal status between each AOM and SESAL are confirmed.	Conclusion of contract: Before procurement of equipment Update status: once / year after procurement	SESAL AOM
	Securing financial resources for equipment O&M cost	Actual O&M cost of the procured equipment is grasped and its financial analysis is conducted. If necessary, the collection and disposal fee collection system for infectious waste will be updated.	After equipment procurement once/year	AOM Supervision by SESAL
	Status of the landfill site planning and infectious waste management plan in Amuprolago	The implementation system for the infectious waste collection and disposal according to the final disposal plan is confirmed.	Before the procurement	AOM Supervision by SESAL
Undertaking by Honduran side	Foundation work for installing the set of sterilizer	Information necessary for foundation work is provided and the progress of the work is confirmed	Before the procurement	SESAL AOM Support by the Consultant
	Electrical wiring work for installing the set of sterilizer	Information necessary for electrical work is provided and the progress of the work is confirmed	Before the procurement	SESAL AOM Support by the Consultant
Environment	Environmental Monitoring Items	Monitoring based on the Project Monitoring Report prescribed by JICA	Refer Table 1.16	Refer Table 1.16
	Acquisition status of the environmental license for sterilizer	The agreement status between SESAL and SERNA is confirmed	Before the procurement	SESAL SERNA
Gender	Male to female ratio of personnel handling procured equipment	Hearing from each target facility during environmental monitoring	Timing of the environmental monitoring	SESAL Hospital AOM

PREPARATORY SURVEY
FOR
THE PROJECT FOR IMPROVEMENT OF
INFECTIOUS WASTE MANAGEMENT IN HONDURAS

FINAL REPORT

APPENDICES

1. Member List of the Survey Team

Member List of the Survey Team (1st Site Survey from July 2022 to August)

Name	Position	Organization
Mr. Akihiro Miyazaki	Leader	Environmental Management Group, Global Environment Department, JICA
Mr. Tadaya Yamamoto	Planning Management	Environmental Management Group, Global Environment Department, JICA
Mr. Ryota Okiguchi	Planning	Environmental Management Group, Global Environment Department, JICA
Mr. Masakazu Maeda	Chief Consultant/SWM /Final Disposal 1	CTI Engineering International Co., Ltd.
Ms. Yuko Samuta	Infectious Waste Management	Kokusai Kogyo Co., Ltd.
Mr. Shinsuke Okamoto	Collection & Transportation /Intermediate Treatment	EX Research Institute Ltd.
Mr. Takuya Fujimura	Equipment Planning and Cost Estimation 2	CTI Engineering International Co., Ltd.
Mr. Sebastian Jara	Organization and Finance	CTI Engineering International Co., Ltd.
Mr. Yuta Yamauchi	Environmental and Social Consideration/Natural Condition	CTI Engineering International Co., Ltd.

Member List of the Survey Team (2nd Site Survey in January 2023)

Name	Position	Organization
Ms. Chie Shimodaira	Leader	Environmental Management Group, Global Environment Department, JICA
Mr. Tadaya Yamamoto	Planning Management	Environmental Management Group, Global Environment Department, JICA
Mr. Ryota Okiguchi	Planning	Environmental Management Group, Global Environment Department, JICA
Mr. Masakazu Maeda	Chief Consultant/SWM /Final Disposal 1	CTI Engineering International Co., Ltd.
Ms. Yuko Samuta	Infectious Waste Management	Kokusai Kogyo Co., Ltd.
Mr. Shinsuke Okamoto	Collection & Transportation /Intermediate Treatment	EX Research Institute Ltd.
Mr. Shumpei Ichikawa	Deputy Chief Consultant/Equipment Planning and Cost Estimation 1/ Final Disposal 2	CTI Engineering International Co., Ltd.

2. Survey Schedule

Survey Schedule of 1st Site Survey

Date			JICA			Consultant					
			Miyazaki	Okiguchi	Yamamoto	Maeda	Samuta	Okamoto	Jara	Fujimura	Yamauchi
1	17 Jul 22	Sun	Move						—	—	—
2	18 Jul 22	Mon	Move						Move	—	—
3	19 Jul 22	Tue	Kickoff Meeting							Move	—
4	20 Jul 22	Wed	SESAL Meeting、UNDP Meeting							Move	—
5	21 Jul 22	Thu	Mi AmbienteMeeting								—
6	22 Jul 22	Fri	Move		Site Survey（Escuela universitario、Mario Mendoza）						—
7	23 Jul 22	Sat	Move			Data collection					—
8	24 Jul 22	Sun	—	—		Data collection ilation）					—
9	25 Jul 22	Mon	—	—	Site Survey（San Felipe、INCP）						—
10	26 Jul 22	Tue	—	—	Site Survey（Hospital Psiquiatrico Santa Rosita、Santa Teresa）					Equipment survey	—
11	27 Jul 22	Wed	—	—	Site Survey（Hospital Del Sula）					Equipment survey	—
12	28 Jul 22	Thu	—	—	Site Survey（San Francisco）					Equipment survey	—
13	29 Jul 22	Fri	—	—	Site Survey（Gabriela Alvarado）					Equipment survey	—
14	30 Jul 22	Sat	—	—	Move	Mov）				Data collection	—
15	31 Jul 22	Sun	—	—	Move	Data collection					—
16	1 Aug 22	Mon	—	—	Move	Site Survey（Sensenti）				Equipment survey	—
17	2 Aug 22	Tue	—	—	—	Site Survey（Juan Manuel Gálvez、Mancurisj）				Equipment survey	—
18	3 Aug 22	Wed	—	—	—	Site Survey（Santa Bárbara）				Data collection	Move
19	4 Aug 22	Thu	—	—	—	Site Survey（Mario Catarino Rivas、Leonardo Martínez Valenzuela）				Equipment survey	Move
20	5 Aug 22	Fri	—	—	—	Site Survey（Puerto Cortes）				Equipment survey	Site Survey
21	6 Aug 22	Sat	—	—	—	Move				Data collection	Move
22	7 Aug 22	Sun	—	—	—	Data collection					
23	8 Aug 22	Mon	—	—	—	Site Survey（General Atlántida）				Equipment survey	Site Survey
24	9 Aug 22	Tue	—	—	—	Site Survey（Amuprolago）				Data collection	Site Survey
25	10 Aug 22	Wed	—	—	—	Site Survey（Escuera）、JICA Office Meeting					
26	11 Aug 22	Thu	—	—	—	SESAL Meeting					
27	12 Aug 22	Fri	—	—	—	Recomissioning Contract（HCWM）、Data Compilation				Data collection	
28	13 Aug 22	Sat	—	—	—	Data collection					
29	14 Aug 22	Sun	—	—	—	Data collection					
30	15 Aug 22	Mon	—	—	—	Mi Ambiente Meeting					
31	16 Aug 22	Tue	—	—	—	SESAL Meeting、Inspection of the final disposal site in Tegucigalpa					
32	17 Aug 22	Wed	—	—	—	Data collection					
33	18 Aug 22	Thu	—	—	—	Data collection				Equipment survey	Data collection
34	19 Aug 22	Fri	—	—	—	SESAL Meeting					
35	20 Aug 22	Sat	—	—	—	Equipmentsurvey					
36	21 Aug 22	Sun	—	—	—	Equipmentsurvey					
37	22 Aug 22	Mon	—	—	—	SESALMeeting					
38	23 Aug 22	Tue	—	—	—	Site Survey（Escuera）、JICA Office Meeting					
39	24 Aug 22	Wed	—	—	—	Data collection	Site Survey	Data collection			

Date			JICA			Consultant					
			Miyazaki	Okiguchi	Yamamoto	Maeda	Samuta	Okamoto	Jara	Fujimura	Yamauchi
40	25 Aug 22	Thu	—	—	—	Contract with sub-contractor' (Survey on Environmental and Social Considerations), SESAL Briefing			Contract with sub-contracto (Survey on Environmental and Social Considerations, SESAL Briefing		
41	26 Aug 22	Fri	—	—	—	Visit to Japanese Embassy	Data collection				
42	27 Aug 22	Sat	—	—	—	Contract with sub-contractor (Existing Landfill Site Survey)					
43	28 Aug 22	Sun	—	—	—	Move			Data collection		
44	29 Aug 22	Mon	—	—	—	Move			Site Survey (Escuera), SESAL Meeting		
45	30 Aug 22	Tue	—	—	—	Move			Move	Move	
46	31 Aug 22	Wed	—	—	—	—	—	—	Move	Move	
47	1 Sep 22	Thu	—	—	—	—	—	—	—	Move	

HCWM: Survey on the Healthcare Waste Management System

Survey Schedule of 2nd Site Survey

Date			JICA			Consultant			
			Shimodaira	Okiguchi	Yamamoto	Maeda	Samuta	Okamoto	Ichikawa
1	17 Jan 23	Tue	—	—	—	Move			
2	18 Jan 23	Wed	—	—	—	Move			
3	19 Jan 23	Thu	—	—	—	SESALKickoff Meeting			
4	20 Jan 23	Fri	Move			Site Survey＆Meeting（General San Felipe、INCP）			
5	21 Jan 23	Sat	Move			Meeting with JICA Survey Team			
6	22 Jan 23	Sun	Moveto Santa Rosa						
7	23 Jan 23	Mon	Sensenti Meeting						
8	24 Jan 23	Tue	Mancurisj Meeting						
9	25 Jan 23	Wed	Amuprolago Meeting						
10	26 Jan 23	Thu	—	—	—	Meeting with SESAL, Visit to agencies for equipment			
11	27 Jan 23	Fri	SESAL Wrap Up Meeting, Visit to Japanese Embassy						
12	28 Jan 23	Sat	—	—	—	Data collection			
13	29 Jan 23	Sun	—	—	—	Move			
14	30 Jan 23	Mon	—	—	—	Move			
15	31 Jan 23	Tue	—	—	—	Move			

3. List of Parties Concerned in Honduras

List of Parties Concerned in Honduras

N°	Name	Institution	Dependency	Position	Prefecture	Municipality
1	Dra. Nerza Paz	SESAL	Subsecretariat of Networks	Subsecretary	Francisco Morazan	Tegucigalpa
2	Dra. Suani Montalvan	SESAL	Subsecretariat of Projects and Investment	Subsecretary	Francisco Morazan	Tegucigalpa
3	Dra. Ritza Lizardo	SESAL	Department of Second Level of Attention	Chief	Francisco Morazan	Tegucigalpa
4	Dr. Saul Cruz	SESAL	General Directorate of Networks	General Director	Francisco Morazan	Tegucigalpa
5	Dra. Roxana Diaz	SESAL	Sanitary Surveillance Unit	Technical Staff	Francisco Morazan	Tegucigalpa
6	Licda. Elena Rebeca Martinez	SESAL	Department of Second Level of Attention	Technical Staff	Francisco Morazan	Tegucigalpa
7	Dr. Francisco Medina Ramos	SESAL	Department of Second Level of Attention	Technical Staff	Francisco Morazan	Tegucigalpa
8	Dr. Angel Vasquez	SESAL	Planning and Management Evaluation Unit (UPEG)	Director	Francisco Morazan	Tegucigalpa
9	Sandra (Lawyer)	SESAL	General Directorate for Surveillance of the Regulatory Framework	Technical Staff	Francisco Morazan	Tegucigalpa
10	Miguel Salazar	Intermunicipal Company of Sensenti Valley			Ocotepeque	
11	Wilman Amaya	MANCURISJ				
12	Adalinda Suazo	AMUPROLAGO			Cortez	
13	Ing. Marco Vinicio Molina	SESAL	Unidad Técnica de Gestión de Proyectos (UTGP)		Francisco Morazan	Tegucigalpa
14	Ing. Pablo Rodríguez	UNDP	Proyecto COP´S 4		Francisco Morazan	Tegucigalpa
15	Alan Nuñez	Consultant on Autoclave for PNUD			Francisco Morazan	Tegucigalpa
16	Yaris Zavala	Ministry of Environment	CESCCO		Francisco Morazan	Tegucigalpa
17	Lic. Marvin Martinez	Ministry of Environment	Solid Waste Department		Francisco Morazan	Tegucigalpa
18*	Dra. Alexa Romero	SESAL-BID	Proyecto RISP/HO	Old Coordinator	Francisco Morazan	Tegucigalpa
19	Alberto Sierra	SESAL-BID	Proyecto RISP/HO	New coordinator	Francisco Morazan	Tegucigalpa
20	Nicolas Collin Dit De Montesson	World Bank				
21	Dr. Carlos Sanchez	Hospital Escuela		Director	Francisco Morazan	Tegucigalpa
22	Ing.Erick Martinez Luna	Hospital Escuela	Logistic Department	Director	Francisco Morazan	Tegucigalpa
23	Elmer Murillo	Hospital Escuela	General Services Department	Chief	Francisco Morazan	Tegucigalpa
24	Dr. Mario Aguilar Lopez	Hospital Mario Mendoza		Director	Francisco Morazan	Tegucigalpa
25	Lic. Kenny Giancarlo Guzman	Hospital Mario Mendoza	Resources Management Dpt.	Sub-director	Francisco Morazan	Tegucigalpa
26	Dr. Francis Enrique Varela	Hospital Nacional Cardio Pulmonar	Directorate	Director	Francisco Morazan	Tegucigalpa
27	Dr. Milton Portillo	Hospital Nacional Cardio Pulmonar	Sanitary Surveillance Unit	Chief	Francisco Morazan	Tegucigalpa
28	Mr. Julio Medina	Hospital Nacional Cardio Pulmonar	General Services Department		Francisco Morazan	Tegucigalpa

N°	Name	Institution	Dependency	Position	Prefecture	Municipality
29	Dr. Manuel Gamero	Hospital San Felipe	Sub-directorate of Information management	Sub-Director	Francisco Morazan	Tegucigalpa
30	Javier Romero	Hospital San Felipe			Francisco Morazan	Tegucigalpa
31	Mrs. Jenni Melissa	Hospital San Felipe	Unidad de Desechos Solidos	Jefa	Francisco Morazan	Tegucigalpa
32	Melvin Tunez	Hospital San Felipe			Francisco Morazan	Tegucigalpa
33	Dr. Josue Caceres	Hospital Santa Rosita	Directorate	Director	Francisco Morazan	Tegucigalpa
34	Ing.Alejandra Contreras	Hospital Santa Rosita	Servicios Generales	Chief	Francisco Morazan	Tegucigalpa
35	Lawer Osiris Yaqueline	Hospital Santa Rosita	Administration	Chief	Francisco Morazan	Tegucigalpa
36	Dr. Jose Fernando Alcantara	Hospital Santa Teresa	Subdirectorate	Subdirector	Comayagua	Comayagua
37	Lic. Fredy Jimenez	Hospital Santa Teresa	Administration	Administrator	Comayagua	Comayagua
38	Dr. Jose Cuan	Hospital del Sur	Subdirectorate	Subdirector	Choluteca	Choluteca
39	Ing. Abel Carrasco	Hospital del Sur	Hospital Resources Management	Chief	Choluteca	Choluteca
40	Ing. Ramon Pesa Herrera	Hospital del Sur		In charge of planning	Choluteca	Choluteca
41	Dr. Donaldo Menendez	Hospital San Francisco		Director	Olancho	Olancho
42	Dra. Mericia Breve	Hospital San Francisco	Quality Management		Olancho	Olancho
43	Mr. Ulises Fiallos	Hospital San Francisco	Administration	Administrator	Olancho	Olancho
44	Mr. Rafael Lanze	Hospital San Francisco		Bio-medical from SESAL	Olancho	Olancho
45	Dr. Fernando Breve	Hospital San Francisco	Subdirectorate of information	Subdirector	Olancho	Olancho
46	Dra. Candida Rosa Gonzalez	Hospital Gabriela Alvarado	Directorate	Director	Paraiso	Paraiso
47	Dr. Marlon Estrada	Hospital Gabriela Alvarado	Sub-directorate	Sub-director	Paraiso	Paraiso
48	Mr. Marco Antonio Flores	Hospital Gabriela Alvarado	Administration	Administrator	Paraiso	Paraiso
49	Ms. Dayanara Matute	Mancomunidad Manvasen				
50	Mr. Carlos Molina	Mancomunidad Manvasen				
51	Mr. Nelson Rivera	Mancomunidad Guisayote				
52	Ing. Miguel Salazar	Empresa Intermunicipal de Servicios, Territorio Valle de SENSENTI S.A.DE C.V.	Adminstration	Administrator	Ocotepeque	San Marcos
53	Mileydi Romero	idem	Adminstration		Ocotepeque	San Marcos
54	Dr. Cesar Enamorado	Hospital Juan Manuel Galvez	Directorate	Director	Ocotepeque	San Marcos
55	Dr Jorge Miguel Peralta	Hospital Juan Manuel Galvez	Directorate	Subdirector	Ocotepeque	San Marcos
56	Dr. Nelson Lopez	Hospital Juan Manuel Galvez	Directorate	Epidemiologo	Ocotepeque	San Marcos
57	Lic. Ana Doris Reyes	Hospital Juan Manuel Galvez	Administration	Administrator	Ocotepeque	San Marcos
58	Ing.Wilman Amaya Ayala	Mancomunidad Mancurisj-Project GIRS	Coordination	Coordinator		
59	Ing. Jose Gamez Ferrea	Mancomunidad Mancurisj	General Management	General Manager		
60	Ing. Justo Reyes	San Miguelito Municipality		Mayor		
61	Dra. Carla Paredes	Hospital Santa Barbara	Directorate	Director	Santa Barbara	San Pedro Sula
62	Lic. Migdonio Pineda	Hospital Santa Barbara	Directorate	Administrator	Santa Barbara	San Pedro Sula

N°	Name	Institution	Dependency	Position	Prefecture	Municipality
63	Lic. Maira Noemi Perez	Hospital Santa Barbara	Quality Department	Chief	Santa Barbara	San Pedro Sula
64	Mr. Ramon Claros	Hospital Santa Barbara	Maintenace Unit	Chief	Santa Barbara	San Pedro Sula
65	Dr. Ricardo Peña	Hospital Mario Catarino Rivas	Subdirectorate	Subdirector	Cortes	San Pedro Sula
66	Lic. Reina Cruz	Hospital Mario Catarino Rivas	Nurse Department	Chief	Cortes	San Pedro Sula
67	Dra.Gissela Padilla	Hospital Mario Catarino Rivas	Clinic Management		Cortes	San Pedro Sula
68	Mr. Carlos Andrade	Hospital Mario Catarino Rivas	General Services Department		Cortes	San Pedro Sula
69	Lic. Edgar Benavides	Hospital Mario Catarino Rivas	Administration	Administrator	Cortes	San Pedro Sula
70	Dr. Fredy Rafael Chacon	Hospital Leonardo Martinez	Directorate	Director	Cortes	San Pedro Sula
71	Lic. Luis Acosta	Hospital Leonardo Martinez	Financial Management Depart.		Cortes	San Pedro Sula
72	Dr. Hever Palma	Hospital Puerto Cortes	Health Care Subdirectorate	Health Care Duputy Director	Cortes	Atlantida
73	Mrs. Breggeth Escobar	Hospital Puerto Cortes	Resources Management Subdirectorate		Cortes	Atlantida
74	Mrs. Gina Mendoza	Hospital Puerto Cortes	General Services Department	Chief	Cortes	Atlantida
75	Mr. Ulises Fuentes	Hospital Puerto Cortes	Maintenace Unit	Chief	Cortes	Atlantida

4. Minutes of Discussions

Minutes of Discussions
on the Preparatory Survey for the Project for
the Improvement of Infectious Waste Management in Honduras
(Explanation on Draft Preparatory Survey Report)

With reference to the Minutes of Discussions signed between Secretaría de Estado en el Despacho de Salud (hereafter referred to as "SESAL") and the Japan International Cooperation Agency (hereinafter referred to as "JICA") on 21 July, 2022 and in response to the official request from the Government of the Republic of Honduras (hereinafter referred to as "Honduras") dated 29 August 2022, JICA dispatched the Preparatory Survey Team (hereinafter referred to as "the Team") for the explanation of Draft Preparatory Survey Report (hereinafter referred to as "the Draft Report") for the Project for the Improvement of Infectious Waste Management in Honduras (hereinafter referred to as "the Project").

As a result of the discussions, both sides agreed on the main items described in the attached sheets.

Tegucigalpa, 6, September 2022

Mr. SHINO Katsuhiko
Chief Representative
Japan International Cooperation Agency

Dr. José Manuel Matheu Amaya
Secretario de Estado en el Despacho de Salud
(SESAL)

1

ATTACHMENT

1. Objective of the Project

   The objective of the Project is to strengthen the infectious waste management system for treatment and sterilization by/through installing the necessary equipment and materials for infectious waste management, thereby contributing to prevent the risk of waste-derived infection.

2. Title of the Preparatory Survey

   Both sides confirmed the title of the Preparatory Survey as "the Preparatory Survey for the Project for Improvement of Infectious Waste Management in Honduras".

3. Project site

   Both sides confirmed that the sites of the Project are in Francisco Morazan, Cortés, El Paraiso, Santa Barbara, Atlantida, Olancho, Comayagua, Choluteca, Intibuca, and Ocotepeque, which are shown in Annex 1.

4. Responsible authority for the Project

   Both sides confirmed the authorities responsible for the Project are as follows:

4-1. The Secretaría de Estado en el Despacho de Salud will be the executing agency for the Project (hereinafter referred to as "the Executing Agency"). The Executing Agency shall coordinate with all the relevant authorities to ensure smooth implementation of the Project and ensure that the undertakings for the Project shall be taken care of by relevant authorities properly and on time. The organization charts are shown in Annex 2.

5. Contents of the Draft Report

   After the explanation of the contents of the Draft Report by the Team, the Honduras side agreed to its contents. JICA will finalize the Preparatory Survey Report based on the confirmed items. The report will be sent to the Honduras side around March 2023.

6. Cost estimate
Both sides confirmed that the cost estimate explained by the Team is provisional and will be examined further by the Government of Japan for its approval.

7. Confidentiality of the cost estimate and technical specifications
Both sides confirmed that the cost estimate and technical specifications of the Project should never be disclosed to any third parties until all the contracts under the Project are concluded.

8. Procedures and Basic Principles of Japanese Grant
The Honduras side agreed that the procedures and basic principles of Japanese Grant (hereinafter referred to as "the Grant") as described in Annex 3 shall be applied to the Project. In addition, the Honduras side agreed to take necessary measures according to the procedures.

9. Timeline for the project implementation
The Team explained to the Honduras side that the expected timeline for the project implementation is as attached in Annex 4.

10. Expected outcomes and indicators
Both sides agreed that key indicators for expected outcomes are as follows. The Honduras side will be responsible for the achievement of agreed key indicators targeted in year 2027 and shall monitor the progress for Ex-Post Evaluation based on those indicators.

[Quantitative indicators]
"The amount of infectious waste sterilized at medical facilities" is set as the indicator of the quantitative effect of the Project as shown in Table 1

Table1 Quantitative Effect of the Project

Indicator	Existing Value in 2021	Target Value 3 years after the arrival of the equipment
The amount of infectious waste properly disposed	0 kg / day	2,585 kg / day

[Qualitative indicators]

- Establishment of a wide-area management system for infectious waste in the 21 local municipalities that comprise the Association of Local Authorities.
- Reinforcement of the system for separate storage and collection of infectious waste in public hospitals.
- Reduction of the risk of waste-derived infection among healthcare workers, waste-related businesses, and waste pickers at disposal sites.

11. Ex-Post Evaluation

JICA will conduct ex-post evaluation after three (3) years from the project completion, in principle, with respect to six evaluation criteria (Relevance,Coherence Effectiveness, Efficiency, Impact, Sustainability). The result of the evaluation will be publicized. The Honduras side is required to provide necessary support for the data collection.

12. Technical assistance ("Soft Component" of the Project)

Considering the sustainable operation and maintenance of the products and services granted through the Project, the following technical assistance is planned under the Project. The Honduras side confirmed to deploy necessary number of counterparts who are appropriate and competent in terms of its purpose of the technical assistance as described in the Draft Report.

- Guidance for hospital staff and patients on waste separation
- Drafting manuals for operation and maintenance of equipment
- Guidance for inventory management on spare parts and components of equipment
- Development infectious waste management plan including measurement of the infectious waste

13. Undertakings of the Project

Both sides confirmed the undertakings of the Project as described in Annex 5. With regard to exemption of customs duties, internal taxes and other fiscal levies as stipulated in 1(2)5 of Annex 5, both sides confirmed that such customs duties, internal taxes and other fiscal levies shall be clarified in the bid documents by SESAL during the implementation stage of the Project.

4

The Honduras side assured to take the necessary measures and coordination including allocation of the necessary budget which are preconditions of implementation of the Project. It is further agreed that the costs are indicative, i.e., at Outline Design level. More accurate costs will be calculated at the Detailed Design stage.

Both sides also confirmed that the Annex 5 will be used as an attachment of G/A.

Both sides confirmed that SESAL shall take necessary measures to ensure and maintain the security of the Project site and the persons related to the implementation of the Project, in cooperation with relevant authorities during the Project period. Such security measures shall reasonably reflect needs of the Consultant/the Contractor engaging in the Project, as shown in Annex 5.

Both sides agreed that in case the additional security cost would be necessary for the implementation of the Project, such cost shall be borne by the Recipient without using the Grant.

14. Monitoring during the implementation

The Project will be monitored by the Executing Agency and reported to JICA by using the form of Project Monitoring Report (PMR) attached as Annex 6. The timing of submission of the PMR is described in Annex 5.

15. Project completion

Both sides confirmed that the project completes when all the facilities constructed, and equipment procured by the Grant are in operation. The completion of the Project will be reported to JICA promptly by the Executing Agency, but in any event not later than six months after completion of the Project.

16. Environmental and Social Considerations

The Team explained that JICA Guidelines for Environmental and Social Considerations (January 2022) is applicable for the Project. The Project is categorized as C because the Project is likely to have minimal adverse impact on the environment under the Guidelines.

17. Other Relevant Issues

17-1. Inter-institutional Coordination

JICA explained that the Executing Agency shall be responsible for the coordination with the relevant Associations of Municipalities, namely Sensenti, Mancurisj and Amuprolago, (hereafter referred to as "AOMs") to ensure appropriate management of the Project. In this regard, JICA requested the Executing Agency to conclude a written agreement such as a "Memorandum of Understanding" (hereafter referred to as "MOU") with AOMs respectively.

[i] Based on the MOU, the Executing Agency will lend vehicles and equipment to AOMs, and AOMs shall be responsible for the operation and maintenance of these vehicles and equipment as well as reporting the status to the Executing Agency. In addition, AOMs are responsible for hiring personnel for equipment operations and for expenditure on operation and maintenance costs.

[ii] The MOU shall stipulate the ownership of the equipment procured by the Project is under SESAL and shall be utilized exclusively by SESAL and AOMs for the improvement of infectious waste management.

17-2. Proper and sustainable operation and maintenance for equipment

The Honduras side agreed to take necessary measures for proper and sustainable operation and maintenance of equipment, particularly allocation of necessary human resources and budget needed including forward planning and coordination with relevant organizations.

17-3. Fulfilment of Undertakings

JICA reminded that following requirements before the Bidding, as stipulated 1(1) of Annex 5. In particular, the following items affect the progress of the project and shall be reported on a timely basis for ensuring the installation and operation of the equipment.

- Secure space for installing containers for sterilizing equipment
- Secure space for parking and maintaining heavy equipment at AOMs
- Distribute electrical power line for the installing sterilizing equipment

17-4.Priority of equipment

JICA explained about the possibility of reviewing the equipment list in case of price

escalation and fluctuation of the exchange rate, which are difficult to forecast due to uncertainties of the global situation. Both sides agreed to confirm the priority of equipment for preparation of such situation and conduct discussion and coordination for the review, upon necessity.

17-5. Synergy with the Technical Cooperation Project

The team also explained that the Technical Cooperation Project "Technical assistance for the establishment of joint governance model for the Comprehensive Solid Waste Management" is planned to strengthen the capacity of solid waste management in the AOM of Amuprolago and requested the Honduras side to make efforts to achieve the synergy effects of these Grand Aid and Technical Cooperation Projects.

17-6. Disclosure of Information

Both sides confirmed that the Preparatory Survey Report from which project cost is excluded will be disclosed to the public after completion of the Preparatory Survey. The comprehensive report including the project cost will be disclosed to the public after all the contracts under the Project are concluded.

18. Gender Mainstreaming

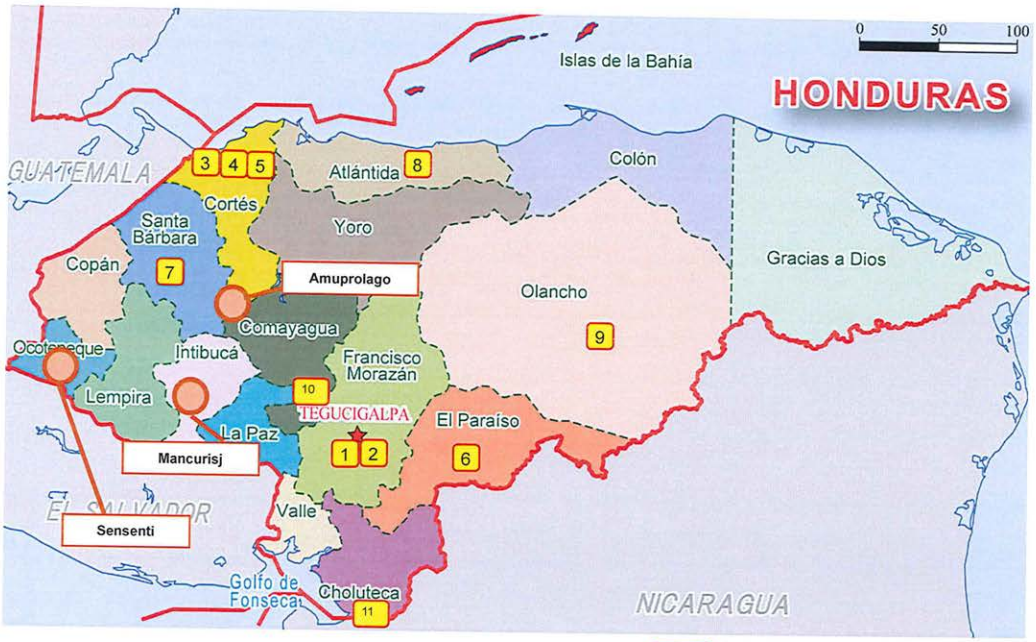
Both sides confirmed that gender mainstreaming should be duly practiced for the Project implementation as the project is categorized as GIP (Gender Equality Project or Project Targeting Women), or GIS (Gender Integrated Project). In particular, both sides agreed on the following gender elements to be integrated into the Project.

- Collection of gender-disaggregated data for monitoring and evaluation (in case gender-related data is included in the indicators for project objective).

Annex 1 Project Site
Annex 2 Organization Chart
Annex 3 Japanese Grant
Annex 4 Project Implementation Schedule
Annex 5 Major Undertakings to be taken by the Government of Honduras
Annex 6 Project Monitoring Report (template)

Annex1

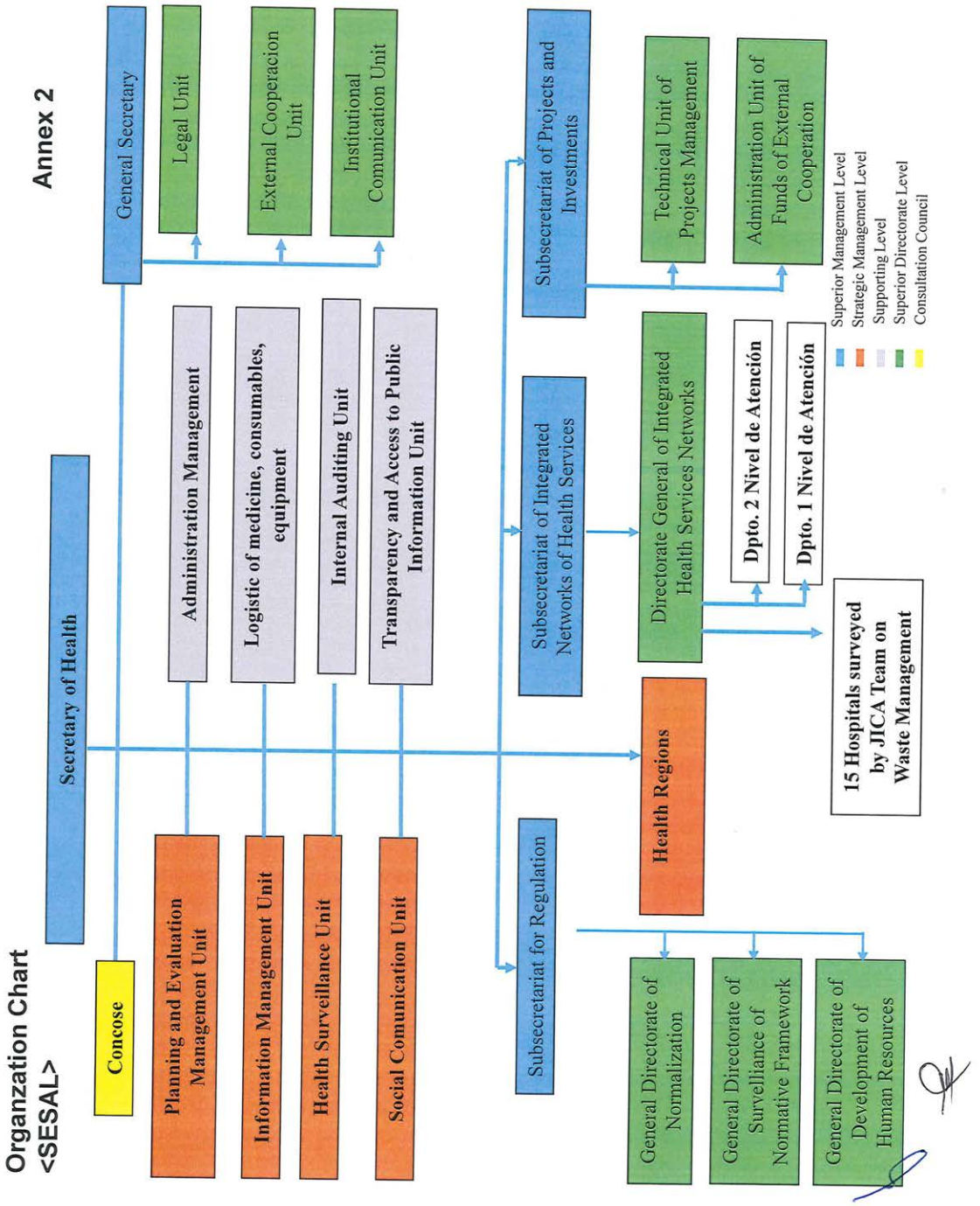
Project Site



No. Hospital

Associations of Municipalities

No.	Target Hospitals	Department
1	San Felipe	FRANCISCO MORAZAN
2	INCP	FRANCISCO MORAZAN
3	Puerto Cortes	CORTES
4	Leonardo Martínez Valenzuela	CORTES
5	Mario Catarino Rivas	CORTES
6	Gabriela Alvarado	EL PARAISO
7	Santa Bárbara	SANTA BARBARA
8	General Atlántida	ATLANTIDA
9	San Francisco	OLANCHO
10	Santa Teresa	COMAYAGUA
11	Hospital Del Sur	CHOLUTECA


Annex 2
Organzation Chart
<SESAL>
Secretary of Health
General Secretary
Legal Unit
External Cooperacion Unit
Institutional Comunication Unit
Concose
Planning and Evaluation Management Unit
Administration Management
Information Management Unit
Logistic of medicine, consumables, equipment
Health Surveillance Unit
Internal Auditing Unit
Social Comunication Unit
Transparency and Access to Public Information Unit
Subsecretariat for Regulation
Subsecretariat of Integrated Networks of Health Services
Subsecretariat of Projects and Investments
Health Regions
Directorate General of Integrated Health Services Networks
Technical Unit of Projects Management
Administration Unit of Funds of External Cooperation
Dpto. 2 Nivel de Atención
Dpto. 1 Nivel de Atención
15 Hospitals surveyed by JICA Team on Waste Management
General Directorate of Normalization
General Directorate of Surveillance of Normative Framework
General Directorate of Development of Human Resources
Superior Management Level
Strategic Management Level
Supporting Level
Superior Directorate Level
Consultation Council

Annex 3

JAPANESE GRANT

The Japanese Grant is non-reimbursable fund provided to a recipient country (hereinafter referred to as "the Recipient") to purchase the products and/or services (engineering services and transportation of the products, etc.) for its economic and social development in accordance with the relevant laws and regulations of Japan. Followings are the basic features of the project grants operated by JICA (hereinafter referred to as "Project Grants").

1. Procedures of Project Grants

Project Grants are conducted through following procedures (See "PROCEDURES OF JAPANESE GRANT" for details):

(1) Preparation

- The Preparatory Survey (hereinafter referred to as "the Survey") conducted by JICA

(2) Appraisal

-Appraisal by the government of Japan (hereinafter referred to as "GOJ") and JICA, and Approval by the Japanese Cabinet

(3) Implementation

Exchange of Notes

-The Notes exchanged between the GOJ and the government of the Recipient

Grant Agreement (hereinafter referred to as "the G/A")

-Agreement concluded between JICA and the Recipient

Banking Arrangement (hereinafter referred to as "the B/A")

-Opening of bank account by the Recipient in a bank in Japan (hereinafter referred to as "the Bank") to receive the grant

Construction works/procurement

-Implementation of the project (hereinafter referred to as "the Project") on the basis of the G/A

(4) Ex-post Monitoring and Evaluation

-Monitoring and evaluation at post-implementation stage

2. Preparatory Survey

(1) Contents of the Survey

The aim of the Survey is to provide basic documents necessary for the appraisal of the the Project made by the GOJ and JICA. The contents of the Survey are as follows:

- Confirmation of the background, objectives, and benefits of the Project and also institutional capacity of relevant agencies of the Recipient necessary for the implementation of the Project.
- Evaluation of the feasibility of the Project to be implemented under the Japanese Grant from a technical, financial, social and economic point of view.
- Confirmation of items agreed between both parties concerning the basic concept of the Project.
- Preparation of an outline design of the Project.
- Estimation of costs of the Project.
- Confirmation of Environmental and Social Considerations

The contents of the original request by the Recipient are not necessarily approved in their initial form. The Outline Design of the Project is confirmed based on the guidelines of the Japanese Grant.

JICA requests the Recipient to take measures necessary to achieve its self-reliance in the implementation of the Project. Such measures must be guaranteed even though they may fall outside of the jurisdiction of the executing agency of the Project. Therefore, the contents of the Project are confirmed by all relevant organizations of the Recipient based on the Minutes of Discussions.

(2) Selection of Consultants

For smooth implementation of the Survey, JICA contracts with (a) consulting firm(s). JICA selects (a) firm(s) based on proposals submitted by interested firms.

(3) Result of the Survey

JICA reviews the report on the results of the Survey and recommends the GOJ to appraise the implementation of the Project after confirming the feasibility of the Project.

3. Basic Principles of Project Grants

(1) Implementation Stage

1) The E/N and the G/A

After the Project is approved by the Cabinet of Japan, the Exchange of Notes (hereinafter referred to as "the E/N") will be signed between the GOJ and the Government of the Recipient to make a pledge for assistance, which is followed by the conclusion of the G/A between JICA and the Recipient to define the necessary articles, in accordance with the E/N, to

implement the Project, such as conditions of disbursement, responsibilities of the Recipient, and procurement conditions. The terms and conditions generally applicable to the Japanese Grant are stipulated in the "General Terms and Conditions for Japanese Grant (January 2016)."

2) Banking Arrangements (B/A) (See "Financial Flow of Japanese Grant (A/P Type)" for details)

a) The Recipient shall open an account or shall cause its designated authority to open an account under the name of the Recipient in the Bank, in principle. JICA will disburse the Japanese Grant in Japanese yen for the Recipient to cover the obligations incurred by the Recipient under the verified contracts.

b) The Japanese Grant will be disbursed when payment requests are submitted by the Bank to JICA under an Authorization to Pay (A/P) issued by the Recipient.

3) Procurement Procedure

The products and/or services necessary for the implementation of the Project shall be procured in accordance with JICA's procurement guidelines as stipulated in the G/A.

4) Selection of Consultants

In order to maintain technical consistency, the consulting firm(s) which conducted the Survey will be recommended by JICA to the Recipient to continue to work on the Project's implementation after the E/N and G/A.

5) Eligible source country

In using the Japanese Grant disbursed by JICA for the purchase of products and/or services, the eligible source countries of such products and/or services shall be Japan and/or the Recipient. The Japanese Grant may be used for the purchase of the products and/or services of a third country as eligible, if necessary, taking into account the quality, competitiveness and economic rationality of products and/or services necessary for achieving the objective of the Project. However, the prime contractors, namely, constructing and procurement firms, and the prime consulting firm, which enter into contracts with the Recipient, are limited to "Japanese nationals", in principle.

6) Contracts and Concurrence by JICA

The Recipient will conclude contracts denominated in Japanese yen with Japanese nationals. Those contracts shall be concurred by JICA in order to be verified as eligible for using the Japanese Grant.

7) Monitoring

The Recipient is required to take their initiative to carefully monitor the progress of the Project in order to ensure its smooth implementation as part of their responsibility in the G/A, and to regularly report to JICA about its status by using the Project Monitoring Report (PMR).

8) Safety Measures

The Recipient must ensure that the safety is highly observed during the implementation of the Project.

9) Construction Quality Control Meeting

Construction Quality Control Meeting (hereinafter referred to as the "Meeting") will be held for quality assurance and smooth implementation of the Works at each stage of the Works. The member of the Meeting will be composed by the Recipient (or executing agency), the Consultant, the Contractor and JICA. The functions of the Meeting are as followings:

a) Sharing information on the objective, concept and conditions of design from the Contractor, before start of construction.

b) Discussing the issues affecting the Works such as modification of the design, test, inspection, safety control and the Client's obligation, during of construction.

(2) Ex-post Monitoring and Evaluation Stage

1) After the project completion, JICA will continue to keep in close contact with the Recipient in order to monitor that the outputs of the Project is used and maintained properly to attain its expected outcomes.

2) In principle, JICA will conduct ex-post evaluation of the Project after three years from the completion. It is required for the Recipient to furnish any necessary information as JICA may reasonably request.

(3) Others

1) Environmental and Social Considerations

The Recipient shall carefully consider environmental and social impacts by the Project and must comply with the environmental regulations of the Recipient and JICA Guidelines for Environmental and Social Considerations (April, 2010).

2) Major undertakings to be taken by the Government of the Recipient

For the smooth and proper implementation of the Project, the Recipient is required to undertake necessary measures including land acquisition, and bear an advising commission of the A/P and payment commissions paid to the Bank as agreed with the GOJ and/or JICA. The Government of the Recipient shall ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the Recipient with respect to the purchase of the Products and/or the Services be exempted or be borne by its designated authority without using the Grant and its accrued interest, since the grant fund

comes from the Japanese taxpayers.

3) Measures to ensure more efficient implementation of the Grant

i) In the event that the E/N and the G/A concerning a project cannot be signed by the end of the following Japanese fiscal year of the cabinet decision concerned by the GOJ, the authorities concerned of the two Governments will discuss the cancellation of the project.

ii) In the event that the period, specified in the G/A, during which the grant is available expires before the completion of the disbursement, the authorities concerned of the GO J will thoroughly review the status, situation and perspective of the implementation of the project concerned before extending the said period. The authorities concerned of the two Governments will discuss the termination of the project including a refund, unless there are concrete prospects for its completion.

iii) Regardless of the period mentioned in ii) above, the authorities concerned of the two Governments will, in the event that five years have passed since the cabinet decision concerned by the GOJ before the completion of the disbursement, except as otherwise confirmed between them, discuss the termination of a project including a refund, unless there are concrete prospects for its completion.

4) Proper Use

The Recipient is required to maintain and use properly and effectively the products and/or services under the Project (including the facilities constructed and the equipment purchased), to assign staff necessary for this operation and maintenance and to bear all the expenses other than those covered by the Japanese Grant.

5) Export and Re-export

The products purchased under the Japanese Grant should not be exported or re-exported from the Recipient.

Annex3-1

PROCEDURES OF JAPANESE GRANT

Stage	Procedures	Remarks	Recipient Government	Japanese Government	JICA	Consultants	Contractors	Agent Bank
Official Request	Request for grants through diplomatic channel	Request shall be submitted before appraisal stage.	x	x				
1. Preparation	(1) Preparatory Survey Preparation of outline design and cost estimate		x		x	x		
2. Appraisal	(2)Preparatory Survey Explanation of draft outline design, including cost estimate, undertakings, etc.		x		x	x		
	(3)Agreement on conditions for implementation	Conditions will be explained with the draft notes (E/N) and Grant Agreement (G/A) which will be signed before approval by Japanese government.	x	x (E/N)	x (G/A)			
	(4) Approval by the Japanese cabinet			x				
3. Implementation	(5) Exchange of Notes (E/N)		x	x				
	(6) Signing of Grant Agreement (G/A)		x		x			
	(7) Banking Arrangement (B/A)	Need to be informed to JICA	x					x
	(8) Contracting with consultant and issuance of Authorization to Pay (A/P)	Concurrence by JICA is required	x			x		x
	(9) Detail design (D/D)		x			x		
	(10) Preparation of bidding documents	Concurrence by JICA is required	x			x		
	(11) Bidding	Concurrence by JICA is required	x			x	x	
	(12) Contracting with contractor/supplier and issuance of A/P	Concurrence by JICA is required	x				x	x
	(13) Construction works/procurement	Concurrence by JICA is required for major modification of design and amendment of contracts.	x			x	x	
	(14) Completion certificate		x			x	x	
4. Ex-post monitoring & evaluation	(15) Ex-post monitoring	To be implemented generally after 1, 3, 10 years of completion, subject to change	x		x			
	(16) Ex-post evaluation	To be implemented basically after 3 years of completion	x		x			

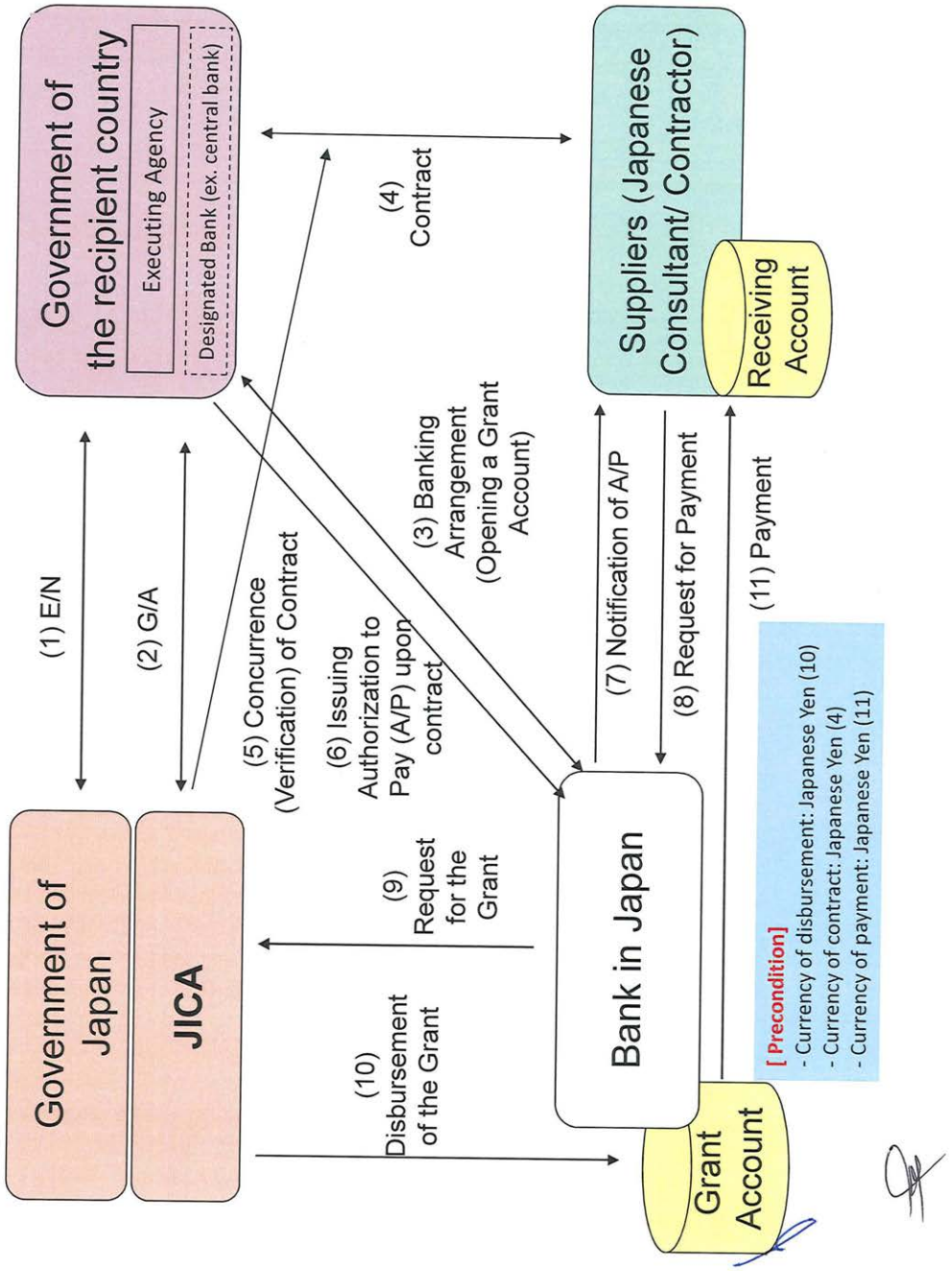
notes:

1. Project Monitoring Report and Report for Project Completion shall be submitted to JICA as agreed in the G/A.

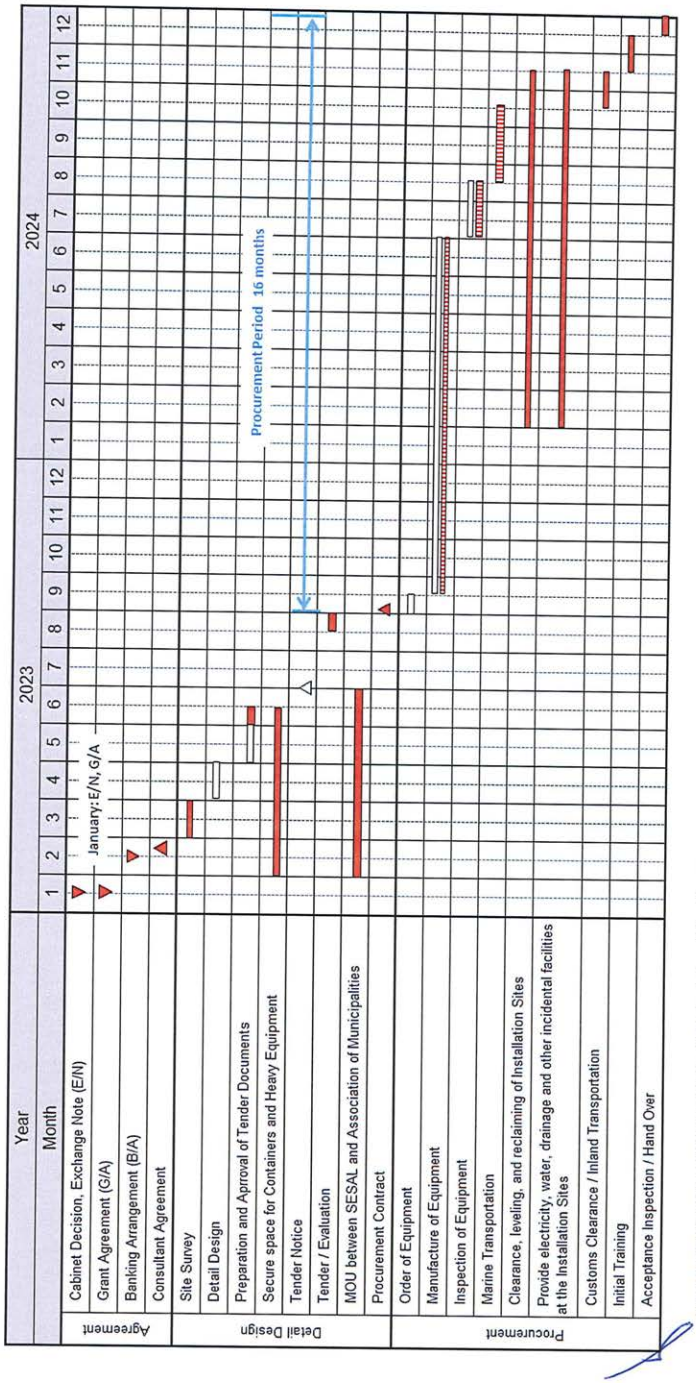
2. Concurrence by JICA is required for allocation of grant for remaining amount and/or contingencies as agreed in the G/A.

Annex3-2

Financial Flow of Japanese Grant (A/P Type)



Annex 4 Project Implementation Schedule



Annex 5

Major Undertakings to be taken by the Government of Honduras

1. Specific obligations of the Government of Honduras which will not be funded with the Grant

(1) Before the Bidding

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To sign the banking arrangement (B/A) with a bank in Japan (the Agent Bank) to open bank account for the Grant	within 1 month after the signing of the G/A	SESAL		
2	To issue A/P to the Agent Bank for the payment to the consultant	within 1 month after the signing of the contract(s)	SESAL		
3	To bear the following commissions to the Agent Bank for the banking services based upon B/A			180 thousand HNL	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	SESAL		
	2) Payment commission for A/P	every payment	SESAL		
4	To secure space for installing/parking equipment				
	1) To determine the space of installing containers for sterilizing equipment in 11 hospitals and 2 AOMs as stipulated in Annex1	Before the bidding documents	SESAL /AOMs		
	2) To clear, level and reclaim the space of installing containers for sterilizing equipment at 11 hospitals and 2 final disposal sites of AOMs	Before start of the installation	SESAL /AOMs	2,600 thousand HNL	
	3) Space for parking and maintenance space for heavy equipment at 3 AOMs	Before the bidding documents	AOMs		
5	To submit Project Monitoring Report (with the result of Detailed Design)	before preparation of the bidding documents	SESAL		

(B/A: Banking Arrangement, A/P: Authorization to pay)

(2)During the Project Implementation

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To issue A/P to the Agent Bank for the payment to the supplier and the contractor	within 1 month after the signing of the contract(s)	SESAL		
2	To bear the following commissions to the Agent Bank for the banking services based upon B/A		SESAL	Included in (1).3	
	1) Advising commission of A/P	within 1 month after the signing of the contract(s)	SESAL		
	2) Payment commission for A/P	every payment	SESAL		
3	To ensure prompt unloading and customs clearance at ports of disembarkation in the country of the Recipient and to assist the Supplier(s) with internal transportation therein	during the Project	SESAL		
4	To accord Japanese physical persons and/or physical persons of third countries whose services may be required in connection with the supply of the products and the services such facilities as may be necessary for their entry into the country of the Recipient and stay therein for the performance of their work	during the Project	SESAL		
5	To ensure that customs duties, internal taxes and other fiscal levies which may be imposed in the country of the Recipient with respect to the purchase of the products and/or the services be exempted by its designated authority without using the Grant];	during the Project	SESAL		
6	To bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project (including obtaining waste management license for installation of sterilizing equipment)	during the Project	SESAL		
7	To notify JICA promptly of any incident or accident, which has, or is likely to have, a significant adverse effect on the environment, the affected communities, the public or workers	during the installation	SESAL		
8	To submit Project Monitoring Report after each work under the contract(s) such as shipping, hand over, installation and operational training	within 1 month after completion of each work	SESAL		
	To submit Project Monitoring Report (final) (including as-built drawings, equipment list, photographs, etc.)	within 1 month after issuance of Certificate of Completion for the works under the contract(s)	SESAL		
9	To submit a report concerning completion of the Project	within 6 months after completion of the Project	SESAL		
10	To provide facilities for distribution of electricity, water supply and drainage and other incidental facilities necessary for the implementation of the Project outside the sites				
	1) Electricity Installation of electricity distribution line to each required site	before start of the installation	SESAL/ AOMs	10,700 thousand HNL	
	2) Water Supply Installation of water distribution line to each required site	before start of the installation	SESAL/ AOMs		

	3) Drainage The city drainage main (for storm, sewer and others) to the site, if necessary *Further conditions to be discussed upon identification of detailed specification of equipment	6 months before completion of the installation	SESAL/ AOMs		
11	To ensure the safety of persons engaged in the implementation of the Project	during the Project	SESAL/AOMs		
12	To take necessary measures for security and safety of the Project site 1) maintaining the safety of workers and the general public by thorough implementation of safety measures and immediate action in the case of accident 2) traffic control around the sites and on transportation routes of equipment and materials	during the implementation	SESAL/ AOMs		
13	To make necessary arrangement and bear all the expenses, other than those covered by the Grant, necessary for the implementation of the Project	during the implementation	SESAL/ AOMs		
14	To develop the monitoring format for periodical reporting operation and maintenance of equipment and materials used in AOMs to SESAL	before start of the installation	SESAL/ AOMs		

(3) After the Project

NO	Items	Deadline	In charge	Estimated Cost	Ref.
1	To submit results of environmental monitoring to JICA, by using the monitoring form, semiannually - The period of environmental monitoring may be extended if any significant negative impacts on the environment are found. The extension of environmental monitoring will be decided based on the agreement between SESAL and JICA.	for 3 years after the Project	SESAL		
2	To maintain and use properly and effectively the equipment provided under the Grant Aid 1) Allocation of maintenance cost 2) Operation and maintenance structure 3) Routine check/Periodic inspection	After installation of the equipment	SESAL/ AOMs	1,368 thousands HNL	
3	To report operation and maintenance of the equipment and materials in AOMs to SESAL based on the monitoring format as agreed (2)14	After installation of the equipment	AOMs		

2. Other obligations of the Government of Honduras funded with the Grant

NO	Items	Deadline	Amount (Million Japanese Yen)*
1	To provide equipment 1) To conduct the following transportation a) Marin transportation of the products from Japan to the country of the Recipient b) Internal transportation from the port of disembarkation to the project site		

	2) To provide equipment with installation and commissioning		
2	To implement detailed design, bidding support and procurement supervision (Consulting Service and Technical Assistance in start-up of operation and maintenance)		

Secretaría de Estado en el Despacho de Salud: SESAL
Associations of Municipalities(Sensenti, Mancurisj and Amuprolago): AOMs
Grant Aid: G/A

Annex 6
G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

Project Monitoring Report
on
Project Name
Grant Agreement No. XXXXXXX
20XX, Month

Organizational Information

Signer of the G/A (Recipient)	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Executing Agency	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:
Line Ministry	Person in Charge (Designation) Contacts Address: Phone/FAX: Email:

General Information:

Project Title	
E/N	Signed date: Duration:
G/A	Signed date: Duration:
Source of Finance	Government of Japan: Not exceeding JPY _____ mil. Government of (_____): _____

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Annex 6
G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

1: Project Description

1-1 Project Objective

1-2 Project Rationale

- Higher-level objectives to which the project contributes (national/regional/sectoral policies and strategies)
- Situation of the target groups to which the project addresses

1-3 Indicators for measurement of "Effectiveness"

Quantitative indicators to measure the attainment of project objectives		
Indicators	Original (Yr)	Target (Yr)
Qualitative indicators to measure the attainment of project objectives		

2: Details of the Project

2-1 Location

Components	Original *(proposed in the outline design)*	Actual
1.		

2-2 Scope of the work

Components	Original* *(proposed in the outline design)*	Actual*
1.		

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Reasons for modification of scope (if any).

(PMR)

2-3 Implementation Schedule

Items	Original		Actual
	(proposed in the outline design)	*(at the time of signing the Grant Agreement)*	

Reasons for any changes of the schedule, and their effects on the project (if any)

2-4 Obligations by the Recipient

2-4-1 Progress of Specific Obligations
See Attachment 2.

2-4-2 Activities
See Attachment 3.

2-4-3 Report on RD
See Attachment 11.

2-5 Project Cost

2-5-1 Cost borne by the Grant(Confidential until the Bidding)

Components			Cost (Million Yen)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			
Total				

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar = Yen

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G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

2-5-2 Cost borne by the Recipient

Components			Cost (1,000 Taka)	
	Original *(proposed in the outline design)*	Actual *(in case of any modification)*	Original[1),2)] *(proposed in the outline design)*	Actual
	1.			

Note: 1) Date of estimation:
2) Exchange rate: 1 US Dollar =

Reasons for the remarkable gaps between the original and actual cost, and the countermeasures (if any)

(PMR)

2-6 Executing Agency

- Organization's role, financial position, capacity, cost recovery etc,
- Organization Chart including the unit in charge of the implementation and number of employees.

Original *(at the time of outline design)* name: role: financial situation: institutional and organizational arrangement (organogram): human resources (number and ability of staff):
Actual *(PMR)*

2-7 Environmental and Social Impacts

- The results of environmental monitoring based on Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- The results of social monitoring based on in Attachment 5 (in accordance with Schedule 4 of the Grant Agreement).
- Disclosed information related to results of environmental and social monitoring to local stakeholders (whenever applicable).

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G/A NO. XXXXXXX
PMR prepared on DD/MM/YY

3: Operation and Maintenance (O&M)

3-1 Physical Arrangement
- Plan for O&M (number and skills of the staff in the responsible division or section, availability of manuals and guidelines, availability of spareparts, etc.)

Original *(at the time of outline design)*
Actual *(PMR)*

3-2 Budgetary Arrangement
- Required O&M cost and actual budget allocation for O&M

Original *(at the time of outline design)*
Actual *(PMR)*

4: Potential Risks and Mitigation Measures

- Potential risks which may affect the project implementation, attainment of objectives, sustainability
- Mitigation measures corresponding to the potential risks

Assessment of Potential Risks *(at the time of outline design)*

Potential Risks	Assessment
1. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
2. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low

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PMR prepared on DD/MM/YY

	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
3. (Description of Risk)	Probability: High/Moderate/Low
	Impact: High/Moderate/Low
	Analysis of Probability and Impact:
	Mitigation Measures:
	Action required during the implementation stage:
	Contingency Plan (if applicable):
Actual Situation and Countermeasures (PMR)	

5: Evaluation and Monitoring Plan (after the work completion)

5-1 Overall evaluation

Please describe your overall evaluation on the project.

5-2 Lessons Learnt and Recommendations

Please raise any lessons learned from the project experience, which might be valuable for the future assistance or similar type of projects, as well as any recommendations, which might be beneficial for better realization of the project effect, impact and assurance of sustainability.

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PMR prepared on DD/MM/YY

5-3 Monitoring Plan of the Indicators for Post-Evaluation

Please describe monitoring methods, section(s)/department(s) in charge of monitoring, frequency, the term to monitor the indicators stipulated in 1-3.

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PMR prepared on DD/MM/YY

Attachment

1. Project Location Map
2. Specific obligations of the Recipient which will not be funded with the Grant
3. Monthly Report submitted by the Consultant

Appendix - Photocopy of Contractor's Progress Report (if any)
- Consultant Member List
- Contractor's Main Staff List

4. Check list for the Contract (including Record of Amendment of the Contract/Agreement and Schedule of Payment)
5. Environmental Monitoring Form / Social Monitoring Form
6. Monitoring sheet on price of specified materials (Quarterly)
7. Report on Proportion of Procurement (Recipient Country, Japan and Third Countries) (PMR (final)only)
8. Pictures (by JPEG style by CD-R) (PMR (final)only)
9. Equipment List (PMR (final)only)
10. Drawing (PMR (final)only)
11. Report on RD (After project)
12. Report on the Management of Safety for Construction Works

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Attachment 6

Monitoring sheet on price of specified materials

1. Initial Conditions (Confirmed)

	Items of Specified Materials	Initial Volume A	Initial Unit Price (¥) B	Initial total Price C=A×B	1% of Contract Price D	Condition of payment	
						Price (Decreased) E=C−D	Price (Increased) F=C+D
1	Item 1	●●t	●	●	●	●	
2	Item 2	●●t	●	●	●		●
3	Item 3						
4	Item 4						
5	Item 5						

2. Monitoring of the Unit Price of Specified Materials
(1) Method of Monitoring : ●●

(2) Result of the Monitoring Survey on Unit Price for each specified materials

	Items of Specified Materials	1st ●month, 2015	2nd ●month, 2015	3rd ●month, 2015	4th	5th	6th
1	Item 1						
2	Item 2						
3	Item 3						
4	Item 4						
5	Item 5						

(3) Summary of Discussion with Contractor (if necessary)
-

Attachment 7

Report on Proportion of Procurement (Recipient Country, Japan and Third Countries)
(Actual Expenditure by Construction and Equipment each)

	Domestic Procurement (Recipient Country) A	Foreign Procurement (Japan) B	Foreign Procurement (Third Countries) C	Total D
Construction Cost	(A/D%)	(B/D%)	(C/D%)	
Direct Construction Cost	(A/D%)	(B/D%)	(C/D%)	
others	(A/D%)	(B/D%)	(C/D%)	
Equipment Cost	(A/D%)	(B/D%)	(C/D%)	
Design and Supervision Cost	(A/D%)	(B/D%)	(C/D%)	
Total	(A/D%)	(B/D%)	(C/D%)	

Attachment 12

Report on the Management of Safety for Construction Works

Month/Year 2022 年×月	Cumulative number of labor 労働延人数	Cumulative number of public accident 公衆災害件数	Cumulative hours worked 延べ実労働時間数	Number of deaths and injuries due to industrial accidents 労働災害による死傷者		Death and injuries 死傷者数	Aggregated number of calendar days absent 延べ休業日数	Aggregated number of work-days lost 延べ労働損失日数	Frequency rate 度数率	Severity rate 強度率
This Month 当月				Death 死者						
				More than 4 calendar days absent 休業 4 日以上						
				1 to 3 calendar days absent 休業 1~3 日						
				Total 計						
Total including this month 当月迄累計				Death 死者						
				More than 4 calendar days absent 休業 4 日以上						
				1 to 3 calendar days absent 休業 1~3 日						
				Total 計						

Note 注)

1. Frequency rate is the frequency of occurrence of industrial accidents.
   Frequency rate = (Number of deaths and injuries due to industrial accidents ÷ Cumulative hours worked) × 1,000,000
   度数率＝（労働災害による死傷者数÷延べ実労働時間数）×100 万時間
2. Severity rate is degree of seriousness of the industrial accident.
   Severity rate = (Aggregated number of work-days lost ÷ Cumulative hours worked) × 1,000
   強度率＝（延べ労働損失日数÷延べ実労働時間数）1000 時間
3. Aggregated number of work-days lost = Aggregated number of calendar days absent ×(300÷365)
   Death (7,500 days) : death as a result of an industrial accident includes not only instantaneous death but also death as a result of occupational injury or disease.
   延べ労働損失日数＝延べ休業日数×（300÷365）・・・死亡 7500 日（即死のほか負傷が原因で死亡したものを含む）
4. Frequency rate and severity rate are rounding off the third decimal place.
   度数率・強度率は小数点第 3 位以下四捨五入

5. Soft Component Plan

Appendix 5

PREPARATORY SURVEY
FOR
THE PROJECT FOR IMPROVEMENT OF
INFECTIOUS WASTE MANAGEMENT IN HONDURAS

SOFT COMPONENT PLAN

MARCH 2023

CTI ENGINEERING INTERNATIONAL CO., LTD.
KOKUSAI KOGYO CO., LTD.
EX RESEARCH INSTITUTE LTD.

1 BACKGROUND OF PLANNING THE SOFT COMPONENT

1-1 Background of the Project

Since The Republic of Honduras (hereinafter referred to as "Honduras") is positioned as a low-middle-income country in Latin America region and has a weak healthcare system, with the spread of the Coronavirus disease 2019 (hereinafter referred to as "COVID-19"), it is necessary to properly manage infectious waste to prevent biohazards for essential workers including health and medical workers and nearby residents.

Although there are laws, regulations and official manuals for infectious waste management in Honduras, in-hospital sorting, collection and transportation, sterilization and detoxification and landfill disposal are not properly implemented. The responsibility for management of waste generated in medical facilities lies with the medical institutions that generate the waste but improper management, such as the mixing of infectious waste, has a significant impact and burden on local municipalities that are in charge of municipal waste management.

At large-scale medical facilities in Tegucigalpa metropolitan area, infectious waste is separated and stored inside the hospital and private companies are responsible for the collection and transportation of waste discharged outside the hospital. In Honduras, small municipalities have organized associations of municipalities (hereinafter referred to as “AOMs”) excepting some urban areas and they jointly treat and dispose of the infectious waste. However, none of them are equipped with the enough equipment, systems and know-how necessary for infectious waste management so that it is necessary to improve them as soon as possible through the Project.

Although AOMs are promoting rationalization, including the construction and operation of shared disposal facilities, they lack human resources, technology, knowledge, and equipment, and their systems for municipal waste management (from collection and transportation to final disposal), including treat infectious waste, are not yet sufficiently developed. Therefore, the Japan International Cooperation Agency (hereinafter referred to as "JICA") plans to support capacity building on waste management through a new technical cooperation project.

1-2 Overall Goal and Project Objective

Overall Goal of the Project:	To contribute to improving the sanitary environment in target hospitals and landfill sites, and preventing the risk of infection among medical personnel, waste management companies and local residents.
Project Objective:	To aim to improve the implementation of the collection, transportation, treatment and final disposal of infectious waste as well as the management capacity of the implementing agencies by providing equipment to major hospitals and landfill sites in Honduras,

1-3 Outline of the Project

Based on the results of the Survey and in consultation with the Honduran side, the following project components are planned.

Table 1.1 Project Components

No.	Equipment	Quantity	Breakdown of the Target Facilities	
			Hospital	AOMs
Procurement of Equipment				
1	Sterilizers (50kg/1 cycle)	15	13	2
2	Transformer (30kVA or more)	13	11	2
3	Container (20ft)	15	13	2
4	Bulldozer (21t)	3	-	3
5	Excavator 1 (Bucket 0.8m^3)	2	-	2
6	Excavator 2 (Bucket 0.5m^3)	2	-	2

No.	Equipment	Quantity	Breakdown of the Target Facilities	
			Hospital	AOMs
7	Pick-up Truck (2,000~3,000cc)	4	1	3
8	Truck Scale (45t)	1	-	1
9	Waste container and Cart	44	44	-
10	Weighing Scale	11	11	-
11	Repair Tool for Equipment (High-pressure washing machine and Air compressor)	2	-	2

1-4 Necessity of Soft Component

1-4-1 Aspect of the Operation and Maintenance of the Equipment

In order to solve the inadequate management of infectious waste and implement appropriate infectious waste management, it is necessary to introduce equipment for the detoxification of infectious waste (sterilizer) under the Project, and to operate and maintain it appropriately. On the other hand, the targete hospitals and AOMs does not have an experience of introducing sterilizer for infectious waste. Although some hospitals have autoclaves for medical use, it is not being properly operated due to lack of budget and other consumables.

Therefore, in order to ensure appropriate operation and maintenance (hereinafter referred to as “O&M”) of the procured equipment, this soft component will provide technical support for O&M to hospitals and AOMs, and it is necessary to build a system that can implement sustainable management through developing manuals, etc.

1-4-2 Aspect of Organization and Systems

In the management of infectious waste, it is effective to incorporate the O&M function of the procured equipment into the medical waste management system in Honduras including the regulations and medical waste subcommittee. Therefore, it is necessary for the Secretaría de Estado en el Despacho de Salud (hereinafter referred to as "SESAL") to play a central role in grasping and supervising the actual situation of medical waste management at each hospital. On the other hand, SESAL is not aware of the importance of infectious waste management and lacks the impetus for management.

Therefore, it is necessary to make relevant organizations aware of the importance of infectious waste management, and to build a system that enables appropriate O&M within the existing framework through this soft component.

1-4-3 Target Equipment for the Soft Component

The main target equipment for this soft component is the “sterilizer”. Since there is little experience of its introduction in Honduras, it is necessary to improve the O&M capacity of the hospital and AOM, and to improve the ability to secure occupational health and safety.

In addition, the O&M of the procured equipment for the landfill site operation (bulldozers, excavators, etc.) is not included in this soft component and will be handled by the technical cooperation project planned by JICA in order to strengthen the capacity for municipal solid waste

1-5 Target Organization of the Soft Component

The target organization of the soft component are SESAL which is the executing agency of the Project and hospitals and AOMs that will introduce sterilizer. Candidate staff of this soft component will be decided through the discussion with SESAL, hospital and AOM before its implementation.

2 GOAL of the soft component

Goal of the soft component is “To establish a sustainable O&M system for the procured equipment in SESAL and the target hospitals and associations of municipalities, and to supervise and manage infectious waste in a safe and hygienic manner”.

3 Output of the soft component

To achieve the goal above, the following outputs are set in the soft component.

Output 1: Capacity and function to supervise infectious waste by SESAL is strengthened
Output 2: The status of infectious waste management is grasped at the target hospitals, and appropriate operation and maintenance of procured equipment related to waste management is implemented.
Output 3: The status of infectious waste management by target associations of municipalities is grasped, and appropriate operation and maintenance of procured equipment is implemented.

4 confirmation of the achievement

Table 4.1 shows the method for confirming the degree of achievement of this soft component for each output.

Table 4.1 Confirmation Method of the Achievement

Output	Confirmation Item	Method
Output 1:	- Role of infectious waste management in SESAL, including cooperation with municipalities	- Prescriptive documents indicating roles in SESAL
	- Status of formulation and implementation of infectious waste management plan at target hospitals	- List of plan and implementation status for each hospital through monitoring
	- Necessary budget for O&M of equipment, details of outsourcing to the private sector and budget plan	- Budget/cost calculation sheet, List of outsourcing to the private sector and budget request documents
Output 2:	- Status of establishment and operation of medical waste subcommittee	- List of implementation status of subcommittee for each hospital through monitoring
	- Amount of infectious waste generated at the target hospitals and the status of formulation and implementation of management plans	- Data on the amount of waste generated - List of plans and implementation status for each hospital through monitoring
	- Formulation and operation status of equipment O&M manual	- List of manual formulation status by hospital based on monitoring - Inspection record
	- Inventory management of consumables and spare parts	- Inventory management sheet
Output 3:	- Formulation and operation status of equipment O&M manual	- List of manual formulation status by AOM based on monitoring - Inspection record
	- Inventory management of consumables and spare parts	- Inventory management sheet
	- Amount of infectious waste generated at the target AOM	- Data on the amount of waste generated
	- Implementation status of guidance for separating infectious waste to medical facilities where infectious waste is collected	- Status list for each AOM based on monitoring

5 Soft component activities (input plan)

5-1 Input Policy

This soft component is based on a support by Japanese experts, and dispatches two experts, the project leader who supervises the overall management and the expert of infectious waste management. In addition, since it is necessary to monitor the results in 13 target areas, local staff who are familiar with

medical waste management and medical equipment in hospitals and the circumstances of medical institutions in Honduras will be hired to monitor the status in the 13 locations.

Accompanying the project leader who will carry out activities with SESAL mainly related to Output 1, an English-Spanish interpreter will be dispatched, and the vehicles necessary for the activity will be input.

5-2 Input Plan for the Soft Component

Table 5.1 shows the contents of activities for each output and the scale of input for the whole.

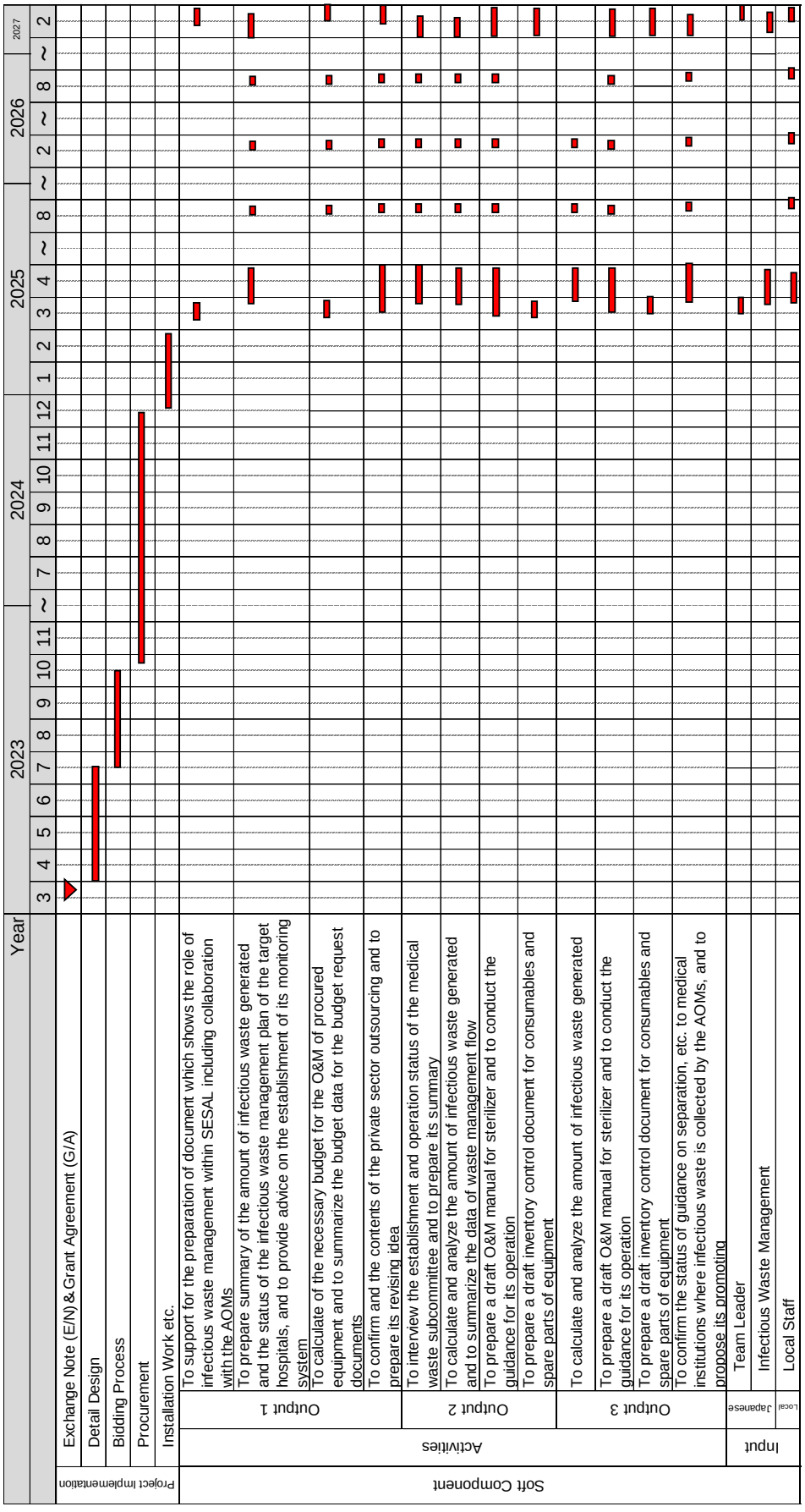
Table 5.1 Activity and Input of Soft Component

Outcome	Activities	Input
<Output 1> Capacity and function to supervise infectious waste by SESAL is strengthened	・To support for the preparation of document which shows the role of infectious waste management within SESAL including collaboration with the AOMs ・To prepare summary of the amount of infectious waste generated and the status of the infectious waste management plan of the target hospitals, and to provide advice on the establishment of its monitoring system ・To calculate of the necessary budget for the O&M of procured equipment and to summarize the budget data for the budget request documents ・To confirm and the contents of the private sector outsourcing and to prepare its revising idea	<Japanese Experts> ・Chief consultant: 1.00 MM ・Infectious waste management: 1.70 MM <Local staff> ・2.10MM <Other> ・Interpreter ・Rental cars
<Output 2> The status of infectious waste management is grasped at the target hospitals, and appropriate operation and maintenance of procured equipment related to waste management is implemented.	・To interview the establishment and operation status of the medical waste subcommittee and to prepare its summary ・To calculate and analyze the amount of infectious waste generated and to summarize the data of waste management flow ・To prepare a draft O&M manual for sterilizer and to conduct the guidance for its operation ・To prepare a draft inventory control document for consumables and spare parts of equipment	
<Output 3> The status of infectious waste management by target associations of municipalities is grasped, and appropriate operation and maintenance of procured equipment is implemented.	・To calculate and analyze the amount of infectious waste generated ・To prepare a draft O&M manual for sterilizer and to conduct the guidance for its operation ・To prepare a draft inventory control document for consumables and spare parts of equipment ・To confirm the status of guidance on separation, etc. to medical institutions where infectious waste is collected by the AOMs, and to propose its promoting	

6 Implementation schedule of soft component

Table 6.1 shows the implementation schedule of this soft component. It will start in March 2025 after the handover of the equipment and will be implemented for two years until February 2027, but the actual activity will be about once every six months.

Table 6.1 Schedule of the Soft Component



7 Report of the Soft Component

The reports of the soft component are shown below. The soft component completion report shall conform to the "Soft Component Guidelines (4th edition)" (November 2020).

- Soft Component Completion Report
- Equipment operation and maintenance (inspection) manual draft
- Inventory management sheet for spare parts etc.

8 Responsibilities of honduras

The responsibilities of the Honduran side regarding the implementation of this soft component are as follows.

8-1 Staff Allocation and Support for Information Collection

Since this soft component will provide guidance on O&M of equipment and formulate manuals etc., it will be necessary to assign personnel in charge of each organization. During the implementation period of this soft component, support for the selection and allocation of these personnel and the collection of necessary information are needed.

8-2 Coordination of Relevant Agencies

In this soft component, in addition to the hospitals under the jurisdiction of SESAL, support will be provided to the AOMs. Therefore, when implementing activities in the AOM, SESAL is required to supervise the AOM. SESAL will coordinate with the AOM in advance and seek their understanding of the activities related to this soft component.

In addition, since it is desirable for the AOM to give guidance to the medical institutions that collect infectious waste, such as sorting, SESAL will notify these medical facilities and coordinate the implementation of infectious waste management tasks, which the AOM and medical facilities can smoothly communicate.

8-3 Continuous Activities and Formulation of a Reporting / Supervision System

After the end of the soft component, SESAL shall regularly and autonomously conduct progress supervision and formulate work execution reporting system to ensure that each hospital and AOM will continue to carry out appropriate O&M of equipment, budgetary measures, updating infectious waste management plans, and monitoring.