NO.

STUDY REPORT
ON
THE PROJECT
FOR
IMPROVEMENT OF EXPANDED PROGRAMME ON IMMUNIZATION THROUGH REHABILITATION OF COLD CHAIN
IN
THE REPUBLIC OF ZAMBIA

June 2001

Japan International Cooperation Agency

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Preface

In response to a request from the Government of the Republic of Zambia, the Government of Japan decided to conduct a study on the Project for Improvement of Expanded Programme on Immunization through Rehabilitation of Cold Chain (Grant Aid for Child Health), and entrusted the Japan International Cooperation Agency (JICA) to conduct the study with the assistance of the Japan International Cooperation System (JICS).

JICA sent to Zambia a study team over the period from February 26 to March 24, 2001.

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

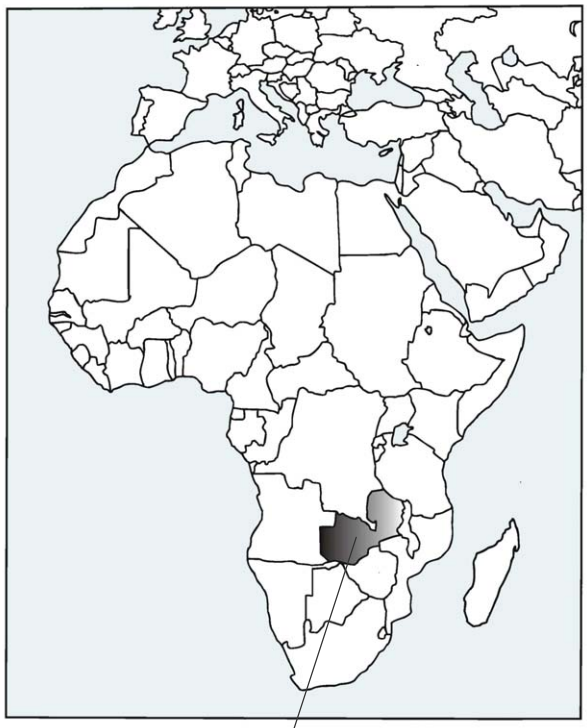
I wish to express my sincere appreciation to the officials concerned of the Government of the Republic of Zambia for their close cooperation extended to the team.

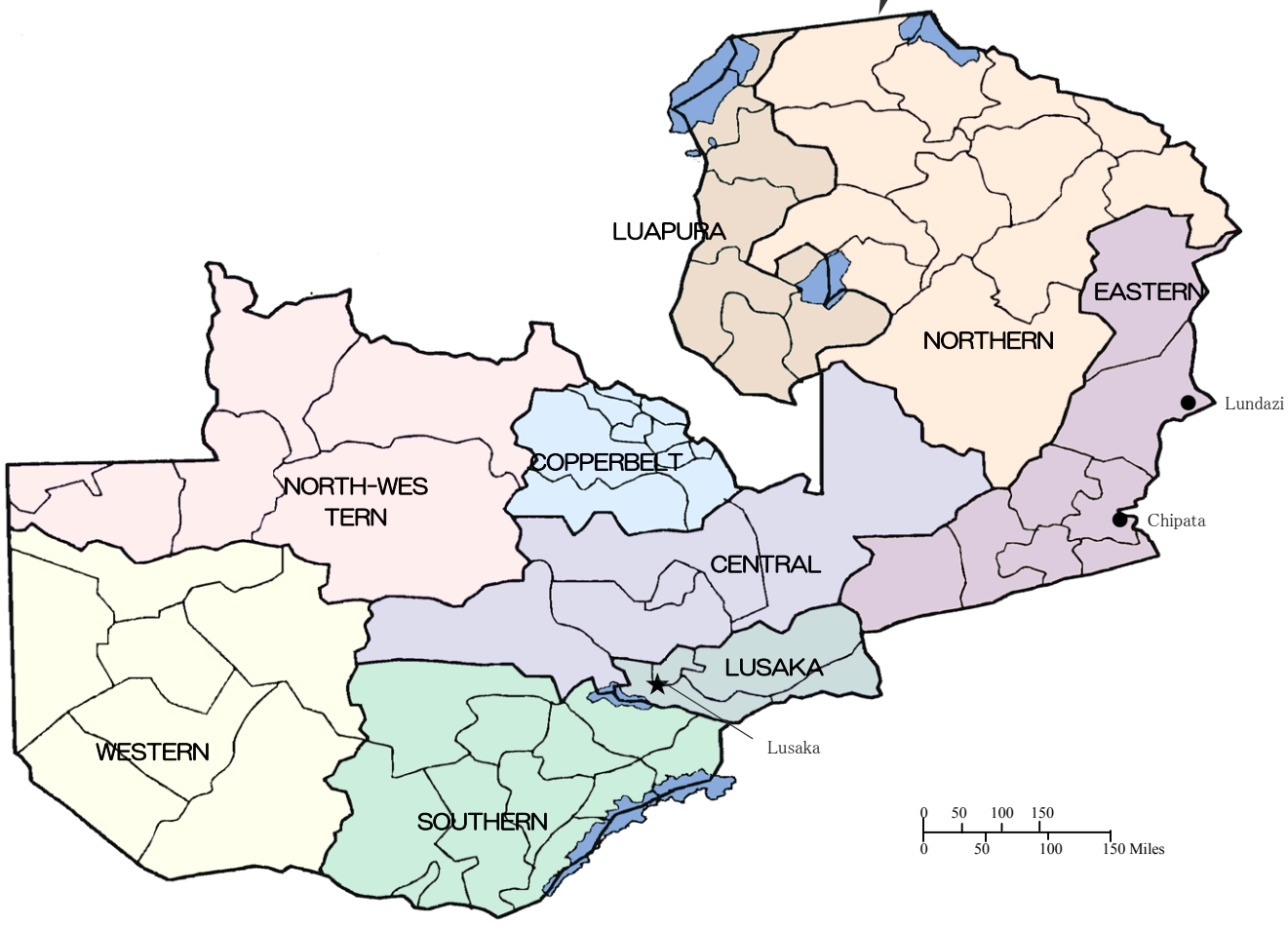
June 2001

President

Japan International Cooperation Agency

PROVINCE	DISTRICT
LUAPRA	Chienge, Nchelenge, Kawambwa, Mwense, Mansa, Samfya, Mlenge
NORTHERN	Kaputa, Mpulungu, Mporokoso, Luwingu, Chilubi, Kasama, Mungwi, Mbala, Nakonde, Isoka, Mpika, Chinsali
EASTERN	Chama, Lundazi, Mambwe, Chipata, Chadiza, Katete, Petauke, Nyimba
COPPERBELT	Chiliabombwe, Mufulira, Chingola, Kalulushi, Kitwe, Ndola Urban, Luanshya,, Lufuwanyama, Mpongwe, Masaiti
CENTRAL	Serenje, Mkushi, Kapriri Mpohsi, Kabwe Urban, Chibombo, Mumbwa
NORTH-WESTERN	Solwezi, Mwinilunga, Kabompo Zambezi, Chavuma, Mufumbwe, Kasempa
WESTERN	Lukulu, kalabo Mongu, Kaoma, Senanga, Shangombo, Sesheke
SOUTHERN	Itezhi-Tezhi, Namwala, Monze, Mazabuka, Choma, Siavonga, Gwembe, Sinazongwe, Kalomo, Kazungula, Livinstone,
LUSAKA	Chongwe, Luangwa, Lusaka Urban, Kafue





- Location Map -

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Abbreviations

AFP	Acute Flaccid Paralysis
BCG	Bacille Calmette Guerin(tuberculosisi vaccine)
CBoH	Central Board of Health
CDC	Centrer fo Disease Control
CFC	Chloro Fluoro Carbon
CSO	Central Statistics Office
CO	Clinical Officer
DANIDA	Danish International Development Assistance
DHMB	District Health Management Board
DHMT	District Health Management Team
DPT	Diphtheria, Pertussis and Tetanus(vaccine)
DR	Democratic Republic (of Congo)
EPI	Expanded Programme on Immunization
GAVI	Global Alliance for Vaccines and Immunization
GRZ	Government of the Republic of Zambia
Hib	Haemophilus Influenza B
MoH	Ministry of Health
NIDs	National Immunization Days
NMCC	National Malaria Control Center
OPV	Oral Polio Vaccine
PHC	Primary Health Care
SFH	Society for Family Health
TT	Tetanus Toxoid
UCI	Universal Child Immunization
UNDP	United Nations Development Programme
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization
ZDHS	Zambia Demographic and Health Survey
ZEM	Zambia Enrolled Midwife
ZEN	Zambia Enrolled Nurse

Chapter 1 Background of the Project

The Ministry of Health (MOH) of the Republic of Zambia (hereinafter referred to as "Zambia") has formulated a Cold Chain Rehabilitation Five-Year Plan, under which outdated cold chain equipment installed more than ten years ago will be replaced by the year 2003. According to the plan, rehabilitation of all of the cold chain equipment will require an estimated US$ 4 million. As this amount exceeds the budget that the country itself can provide, requests were made to other donors who provide medical cooperation such as SIDA, USAID and the Netherlands. However, these requests were not met. In 2000, UNICEF, which conducts various technical and financial support in collaboration with WHO, such as the Expanded Program of Immunization (EPI) Activities and malaria prevention measures, increased its aid for cold chain equipment by a total of eight times that of the previous year (Table 1-1). For the most part, however, this aid was used to purchase spare parts and tools for refrigerator repair, and does not extend to replacement of the freezers and refrigerators themselves.

Table 1-1. Cold chain aid expenses provided by UNICEF

Unit: US$

	1999	2000
Spare parts	9,041	43,946
Vaccine carriers, etc.	0	4,355
Accessories for refrigerators or freezers	0	26,125
Total	9,041	74,426

Figures taken from UNICEF documents

Given these circumstances, a request has been made to Japan for procurement of the necessary items. Table 1-2 shows the contents of the requested equipment items.

Table 1-2. Contents of request from Zambia

Item		Q'ty	Item		Q'ty
1) Central Vaccine Store			16	Solar panel 75 watts	550
1	Walk-in cold room (with generator)	2	17	Solar panel 50 watts	450
2) District Vaccine Store (incl. health centers)			18	12 VDC batteries for solar system	150
2	Solar refrigerators	325			
3	Icelined refrigerators	80	19	Thermometer –30 to +50°C	8,000
4	Electric refrigerators	100	20	Battery acid	1
5	Electric freezers	80	21	Distilled water	1
6	Kerosene/Electric refrigerators	300	22	Kerosene stoves	600
7	Spare parts for cold chain equipment	1	23	2 plate Cooker for sterilization of syringes and needles	400
			3) Equipment and tools for cold chain maintenance		
8	Large cold box	125	24	Equipment and tools for National Cold Chain Workshop	1
9	Small cold box	125	25	Equipment and tools for training activities	1
10	Vaccine carrier	1,000	26	Equipment and tools for district technicians (A)	75
				Equipment and tools for district technicians (B)	12
11	Double rack Steam sterilizer	500			
12	Single rack Steam sterilizer	500	4) Others		
13	Spare parts	1	27	4×4 pickup truck	1
			28	Spare parts for pickup truck	1
14	Solar tube light 13 watts	350	29	Computer	1
15	Spare tube lights	700			

Chapter 2 Contents of the Project

2-1 Basic Concept of the Project

Zambia is aiming to increase the total immunization rate to 90% by 2004 in order to reduce the morbidity and mortality rate for infants and toddlers under five years old. Additionally, the Cold Chain Rehabilitation Five-Year Plan has been formulated with the intention of replacing old and deteriorated freezers and refrigerators with new ones that do not use CFCs. The objective of this plan is to improve the current problem of inappropriate storage conditions for vaccines caused by unstable temperature control, and to promote the Expanded Program of Immunization Activities (EPI activities). The project targets 1,244 health centers and will involve the renovation of cold chain equipment that is ten years old or older (approximately 70% of the total equipment), resulting in improved support for appropriate vaccine control. In addition, the equipment and tools needed in order to maintain the equipment will be provided to district health offices, in order to support training equipment repair technicians, enabling more efficient maintenance of the equipment.

The aim of this project is to procure renovated equipment to replace all of the walk-in cold rooms, the solar, kerosene and electric refrigerators, and the cold boxes that are included in the planning for the Cold Chain Rehabilitation Five-Year Plan.

2-2 Basic Design of the Requested Japanese Assistance

2-2-1 Design Policy

(1) **Basic policy**

In conformance with the survey policy set forth by WHO in 1996, the planning for this project was formulated based on an equipment inventory created as part of a conditions survey conducted in February 2001. According to this inventory, there are ice-lined electric refrigerators and vaccine and ice-pack chest freezers at the district health offices. The district health offices and the various health centers also hold electric, kerosene/electric, and solar refrigerators. The project will cover equipment that is used more than ten years and/or inappropriate for vaccine storage.

The initial contents of the request included, in addition to cold chain equipment, equipment and tools for maintenance, vehicle, computers, steam sterilizers for syringes, and other related equipment, but it was decided to exclude computers, steam sterilizers for syringes and other related equipment from the project since adequate reasons were not provided for the requests, as described later.

1) Target regions and facilities

The target site of the project is the entire country of Zambia. Targeted facilities include one Central Vaccine Store, 72 district health offices, and 1,244 health centers.

2) Items to be procured

i) Cold chain equipment

This project targets equipment that was installed at least more than ten years ago and has deteriorated noticeably, as well as equipment that provides unstable temperature control even if it was installed within the last ten years (but has been

in use for more than five years). The aim is to replace equipment unsuitable for vaccine storage, such as household refrigerators. The equipment includes prefabricated-type walk-in freezer rooms and cold rooms, refrigerators, freezers, cold boxes, vaccine carriers and spare parts for all of these. Also, to stabilize power supplies, voltage regulators for compression refrigerators will be provided. The distance from the district health office to the health center and the situation of the infrastructure are taken into consideration in order to select appropriate equipment among solar, electric, and/or kerosene/electric types. Basically, if the facility is within 50 km of the district health office, electric equipment will be provided, and if 250 km or more, solar equipment will be provided. If the facility is between 50 and 250 km, either solar or kerosene/electric equipment will be selected after observation in the region. The cubic capacity of the refrigerators and freezers will be decided by calculating the population in each state and district who are in the age range targeted for vaccine immunizations and the necessary quantity of vaccines to be stored (see Appendix 1). For example, in Chipata, as listed in the Appendix, there are 32 health centers, and the cubic capacity required in order to store the necessary quantity of vaccines each year is 0.7890 m^3 (0.7890 / 32) = 24 liters. Consequently, a 24-liter refrigerator of either the electric or kerosene/electric type will be selected.

ii) Vehicle

The workshops do not have their own vehicle, and are not able to pick up equipment needing repair, or to transport repaired equipment back to the original location. For this reason, a vehicle will be provided for the purpose of delivering equipment and for use in maintenance.

iii) Equipment and tools for maintenance

Equipment and tools will be provided for technicians at the district health offices and for the National Workshop.

iv) Thermometers

Thermometers will be provided for temperature control of refrigerators and freezers.

3) Quantities to be procured

Table 2-1 shows the quantities of items to be procured, and the reasons for procuring them.

Table 2-1. Procurement quantities and reasons

	Item	Qty	Installation Site				Planning and reason
			Central Warehouse	Provincial Health Office (9)	District Health Office (72)	Health center (1,244)	
1	Prefabricated type walk-in cold room (and spare parts)	1	2	0	0	1	These will be installed in the Central Warehouse. Of the two currently available, one is unusable and the other is more than ten years old and has deteriorated.
2	Prefabricated type walk-in freezer room (and spare parts)	1	0	0	0	1	
3	Icelined refrigerator	73	0	0	73	0	One will be distributed to each district health office for vaccine storage. Two will be provided to Lusaka Province, which has a large population.
4	Vaccine/Icepack Chest freezer	89	16	0	73	0	16 will be installed at the Central Warehouse for storage of OPV and measles vaccines. One will be distributed to each district health office for storage of ice-pack vaccines (two for Lusaka Province).
5	Electric refrigerator	300	0	0	0	300	Among the health centers that have aged and deteriorating kerosene-type refrigerators, these refrigerators will be provided to 30 locations such as Lusaka and Copperbelt Provinces, where equipment has been replaced with electric models, and to 162 health centers built after 1997, where household refrigerators and unsuitable refrigerators are being used. A total of 108 electric refrigerators that have deteriorated will also be replaced.
6	Kerosene/Electric refrigerator	270	0	0	0	270	These will replace kerosene-type refrigerators that have been in use for over 10 years and have deteriorated.
7	Solar refrigerator system (and spare parts including batteries etc.)	96	0	0	0	96	60 refrigerators at district health offices and health centers will be replaced because of deterioration and other problems. Another 36 will be distributed to new health centers, for a total of 96.
8	Voltage Regulator for compression refrigerators	73	0	0	73	73	
9	Large cold box	144	0	0	144	0	These will be used when vaccines are transported from the district health offices to the health centers. Two will be provided to each of 72 district health offices, with one serving as a spare.
10	Small cold box	144	0	0	144	0	
11	Vaccine carrier	1,244	0	0	0	1,244	These will be used when vaccines are transported from the health centers for vaccine immunizations. One will be provided to each of 1,244 health centers.
12	Thermometer –30 to +50 degrees centigrade	4,976	0	0	0	4,976	These will be used for temperature control of refrigerators and freezers at 1,244 health centers. Four will be provided at each location.
13	Equipment and tools for National Cold Chain Workshop (A-1)	1	1	0	0	1	These are sets of equipment for repairs that will be provided to the Central Warehouse. They comprise sophisticated supplies for repairs that cannot be done at the district health offices.
14	Equipment and tools for National Cold Chain Workshop (A-2)	1	0	0	0	1	Same as above
15	Equipment and tools for district technicians (B)	74	1	0	73	74	These will be provided for use by engineers at the district health offices and the Central Warehouse. They will be used for installation of solar refrigerator systems and for maintenance of cold chain equipment.
16	4×4 Pick-up truck, single cabin (including spare parts)	1	1	0	0	0	One truck will be provided to the Central Warehouse, and used to pick up and return refrigerators and freezers brought in for repairs.

The numbers of solar refrigerator systems required are as follows: 36 for newly established health centers, approximately 60 to replace deteriorated solar refrigerator systems, and 190 to replace deteriorated kerosene-type refrigerators with solar ones, for a total of 286. Of these, 96 solar refrigerator systems will be procured in 38 districts to be installed within the implementation period of the project (to be borne by the Japanese side) and to replace deteriorated refrigerators that are in particularly urgent need . In 1994, when 200 solar refrigerator systems were procured as part of an EU aid project, it took approximately three years to complete the installation of all of the new units. The reasons for the delay in installation were caused by problems such as unsuitable roof structure of the health centers for the solar refrigerator systems. However, such problems are not anticipated in the replacement of the 60 solar refrigerator systems targeted by this project, and since only a limited number is being newly installed, no problems are foreseen.

(2) **Policies concerning natural conditions**

During the rainy season, problems such as washout of roads occur. Therefore it is advisable to finish installation works of the solar refrigerator systems to the various health centers before the rainy season begins in November. Because of that, it was decided to begin the installation work in August. The solar systems will be designed by adopting the lowest data of the Chipata district, which has the least amount of sunshine of 4.21 $km/m^2/day$. Because the minimum temperature is around 5 or 6 degrees ℃, it is not necessary to consider specifications for cold zones for the refrigerators.

(3) **Policies concerning socioeconomic conditions**

In Lusaka and Copperbelt Provinces, where renovations have been made, the electricity situation is good for the most part, but in other areas significant fluctuations in voltage are anticipated. For this reason, voltage regulators are being procured in order to prevent problems caused by fluctuating voltages.

The types of equipment were selected taking into account the distance of the health center from the district health office, the power supply and access to kerosene. Either the electric type, the kerosene/electric type, or the solar type will be selected as optimum for each location based on the available power sources.

(4) **Policies involving the use of local contractors**

A total of 96 solar refrigerator systems are being procured and installed through the project. There are eight distributors handling solar refrigerator systems in Zambia, which are all experienced in installing the refrigerators in health centers. Consequently, there will be no problems with the installation and after-care of the equipment.

A vehicle will be procured from manufacturer which has local agents, considering the convenience in terms of getting spare parts and having repairs carried out.

(5) **Policies concerning capabilities for handling operation and maintenance during the implementation period**

The technicians at the workshops are learning the technology for repairing solar refrigerator equipment and supplies. In order to train technical staff at the district health offices, equipment and tools are being procured for use in training, and equipment and tools will also be procured for use at the various district health offices, to make sure that

maintenance can be carried out effectively at the sites after the training has been completed. From the standpoint of assuring efficient equipment repair, as much of the equipment as possible should be standardized, to avoid drastic differences between the existing materials and supplies and those used for replacement.

To assure quick and efficient installation and maintenance by the technicians at the workshops, a vehicle will be procured exclusively for use by the National Workshop.

(6) **Policies concerning construction and procurement methods, and construction periods**

Installation and initial operation guidance will be provided at the site concerning the solar refrigerator systems and prefabricated walk-in cold and freezer rooms.

This planning envisions that the solar refrigerator systems will be transported and installed as indicated below. The solar refrigerator systems that have arrived in Lusaka will be transported to and stored at the various district health offices. Taking into consideration the positioning of the district health offices located in 38 areas, and the routes to those health offices, the six transportation routes indicated in Table 2-2 are thought to be possible. The farthest point of each route is between 526 and 2,044 kilometers, and transportation is estimated to take from 5 to 20 days. Consequently, transportation will take approximately 2.5 months (70 days) if one truck is used.

Table 2-2. Estimated number of days to the various health offices

	Route	Estimated travel distance	No. of stops at district health office	No. of solar refrigerator systems	No. of days
1	Lusaka to Chipata	526 km	5	7	5
2	Lusaka to Mpulungu	2044 km	7	13	20
3	Lusaka to Chiengi	1159 km	4	5	10
4	Lusaka to Mwinilunga	807 km	4	7	5
5	Lusaka to Chavuma	1116 km	8	35	15
6	Lusaka to Shangombo	1166 km	10	29	15
	Total	6818 km	38	96	70

Because difficulties such as washout of roads arise during the rainy season, it is advisable to finish transportation of the solar refrigerator systems to the various health centers before the rainy season begins in November. Under this project, the equipment is planned to arrive in Lusaka by July at the latest, and installation will begin in August, after the equipment has been delivered to the district health offices by the short routes, which are Route 1 and 4 as shown in Table 2-2. Of the 96 locations, the distance from the district health office to the farthest health center is 180 kilometers, and to the closest health center is 25 kilometers, so the round-trip distance can be covered in one day. One day will be required for installation, so it is expected to take two days at each location to complete the work. As a result, the time required for one health center within the jurisdiction of the district health office was calculated to be two days. If there are two locations within the same jurisdiction, it will take one day for travel and two for installation of the two units, so the time required was calculated to be three days. Similarly, for three locations the travel time will be two days and the installation time three days, for a total of five days. Among areas with five or more centers, the maximum number of days required was calculated based on Kaoma, which has the largest number of centers (at 14 locations). The average

distance to the five health centers in Kaoma is 109 kilometers (distances range from 67 to 148 kilometers), and these are located in a radial pattern with the district health office at the center. There are no roads directly connecting one health center to another, so each center will require a round-trip. Consequently, the number of days required was calculated as one day for installation, one for travel, and one extra day, for a total of three days. Thus, it will take 42 days (3 days x 14) to install the equipment at all of the locations.

Calculating as described above, it will take 233 days to complete installation at all of the 96 locations indicated in Table 2-3.

Table 2-3. List of health centers and no. of days required for installation

	Province	District	Health center	Distance from the district health office	No. of days required for installation
1	Eastern Province	Chipata	Chizenje	80	3
2			Maza-Tuisa	95	
3		Chadiza	Madzela	20	2
4		Mambwe	Masumba		3
5			Chikoka		
6		Petauke	Samdwe	68	2
7	Lusaka Province	Luangwa	Namdombe		2
8	Western Province	Kaoma	Nyambi	144	
9			Nyabi	144	
10			Luampa	7	
11			Mbanyutu	61	
12			Kasabi	142	
13			Kaaba	148	
14			Mayukwa Yukwa	67	42
15			Nonjolo	82	
16			Kahale	83	
17			Kasimba	79	
18			Afumba		
19			Lui		
20			Nyambi		
21			Winda		
22		Kalobo	Lukona	64	
23			Kuuli	50	6
24			Sihole	48	
25			Lukena	112	
26		Lukulu	Sikundoko	105	2
27		Mongu	Kama	87	
28			Mwanawina	68	
29			Ushaa	47	
30			Sitoya	101	27
31			Iloke	120	
32			Nangula	71	
33			Lukalanya	84	
34			Luckweta	122	
35			Nalikwanda	87	
36		Senanga	Litoya	68	
37			Nalolo	100	
38			Kaunga Lueti	104	15
39			Simunga	124	
40			Katba	135	
41		Shangombo	Kaunga Mashi	170	
42			Mutomena	102	
43			Shangombo	102	
44			Sinjebela	176	21
45			Sioma	73	
46			Silowana	33	
47			Sipuma	164	
48		Shesheke	Mushukula	100	
49			Imusho	182	
50			Molombeze	108	
51			Schili Hosp	150	21
52			Bwina	187	
53			Kaywala	192	
54			Mukuai	25	

	Province	District	Health center	Distance from the district health office	No. of days required for installation
55	Southern Province	Choma	Pemba Sub	1	2
56		Gwembe	Lukonde		3
57			Lumbo		
58		Kazungula	Nyawa	124	2
59		Kalomo	Kolonda		2
60		Mazabuk	Namaila	150	
61			Kalama	60	5
62			Chinganinka	60	
63		Siavonga	Munyama	98	2
64		Monze	Katimba	49	2
65	Central Province	Mumbwa	Mukulaikwa	103	2
66		Kaipiri-Mposhi	New Health center		2
67		Chibombo	Kaparu Mission	39	2
68	Northern Province	Mpika	Nabwalya	157	
69			Chalbesa	131	
70			Mambwe	85	18
71			Mwambe	35	
72			Chisansa	75	
73			Senka	104	
74		Mporokoso	Mukolwe		2
75		Luwingu	Katuta	130	2
76		Kasama	Mutola	109	
77			Kasakala	80	5
78			Chuleyoshi	58	
79		Isoko	Muyombe	180	2
80		Mpulungu	Vyamba		2
81	Luapula province	Chinge	Kambole		
82		Kwambwa	Salanga	72	
83		Mwense	Kalundu	135	15
84			Munushi	50	
85		Samfya	Mbalala	60	
86	Northern Western Province	Kasempa	Dengwe	24	2
87		Mwenilunga	Ikelenge	67	3
88			Sailuanga	71	
89		Solwezi	Lukendo		3
90			Mangala		
91		Zambezi	New Health center		2
92		Chavuma	Mission Hospital		
93			Makinjila		5
94			Nyantanda		
95			Chingi		
96	Copperbelt Province	Mpongwe	Mushipashi		2
Total	9	38	96		233

Assuming a 5-day work week, it will take from 11 to 12 months using one team (three persons). If three teams (three persons per team) of installation teams from local distributors are used to carry out installation work at three locations, the work can be completed in four months. As shown in Fig. 2-1, the work can be completed between August and December.

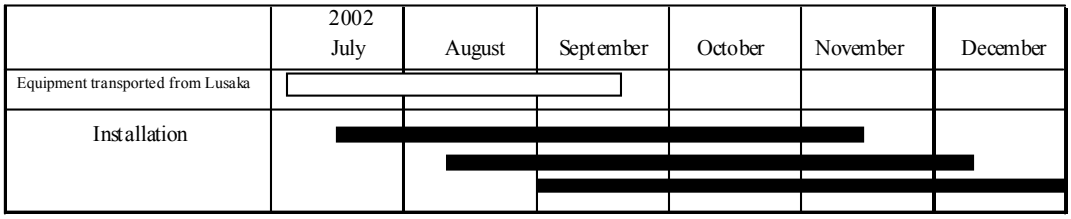


Fig. 2-1 Transportation and installation processes for solar refrigerator systems

2-2-2 Basic Plan (Equipment Plan)

(1) Contents of the equipment

Following discussions with MOH, the equipment contents outlined below were planned. The specific items are listed in Table 2-4.

Table 2-4. Equipment contents

No.	Equipment name	Contents (usage, method) and application	Qty.
1	Prefabricated type walk-in cold room	Approx. 15 m^3, +2°C to +6°C, for vaccine storage	1
2	Prefabricated type walk-in freezer room	Approx. 15 m^3, -20°C to +5°C, for vaccine storage	1
3	Ice-lined refrigerator	Compression type, approx. 108 liters, for vaccine storage	73
4	Vaccine/icepack chest freezer	Compression type, approx. 260 liters, for vaccine storage and ice-pack freezing	89
5	Electric refrigerator	Compression type, approx. 24 liters, for vaccine storage	300
6	Kerosene/electric refrigerator	Absorption type, approx. 24 liters, for vaccine storage	270
7	Solar refrigerator system	System type (refrigerator main unit, solar panel, battery, controller, stand set), approx. 14 liters, for vaccine storage	96
8	Voltage regulator for compression refrigerators	220 V, 50 Hz, for electrical refrigerators and freezers at district health offices	73
9	Large cold box	Approx. 20-23 liters, with ice pack, for vaccine transport	144
10	Small cold box	Approx. 9 liters, with ice pack, for vaccine transport	144
11	Vaccine carrier	Approx. 1.6 liters, with ice pack, for vaccine transport	1,244
12	Thermometer	-30°C to +50°C, plastic, for vaccine refrigerator temperature control	4,976
13	Equipment and tools (A-1)	Approx. 80 items, for refrigerator maintenance (for the National Workshop)	1 set
14	Equipment and tools (A-2)		
15	Equipment and tools (B)	Approx. 50 items, for refrigerator maintenance (for repair technicians at the National Workshop and district health offices)	74 sets
16	Vehicle	Single-cab pickup truck, 4-wheel drive, diesel engine, steering wheel on right, air conditioning, for refrigerator transport and inspection/repair rounds	1

The initial request included steam sterilizers for syringes and other related items, as well as computers, but these were excluded for the reasons outlined below.

i) Computers

Three computers and two printers were provided by UNICEF in 2000, and one of the computers was allocated to the National Workshop. It was explained that this computer has broken down, but because the one-year warranty period is still in effect, it was thought that the computer can be repaired, and was thus deleted from the request.

ii) Steam sterilizers for syringes and other related items

Because auto-disable syringes (see note) (hereafter referred to as AD syringes) have not yet been introduced, 1,000 steam sterilizers to be allocated to all of the health centers were requested (500 single rack and 500 double rack), but the survey showed that US$ 48,777 worth of AD syringes and safety boxes were provided by UNICEF in 1999, along with another US$ 122,208 in 2000. Also, the requested data have not been submitted, such as a list of health centers needing new sterilizers where AD syringes have not yet been introduced, the reasons for their need and the frequency of use. As a result, if steam sterilizers are provided as requested through this project, it will become necessary to recommend that re-usable syringes be provided in fields where AD syringes should be used, and there is a strong possibility that this will run counter to the policy being promoted by WHO, UNICEF, and MOH of Zambia itself, to introduce AD syringes. For this reason, steam sterilizers were excluded from the planning.

(2) Provision of various equipment items

Following discussions with the EPI section of MOH, planning for provision of the various items of equipment was formulated as shown in Table 2-5.

(Note) Auto-disable syringes: These are syringes that cannot be re-used, to avoid secondary infection, and are recommended by WHO and UNICEF.

Table 2-5. Equipment provision planning

Province / District	No. of Health Centers	Prefabricated type Walk-in Cold /Freezer room	Icelined refrigerator	Electric freezer	Electric refrigerator	Kerosene /Electric refrigerator	Solar refrigerator system	Voltage Regulator for compression refrigerators	Large cold box	Small cold box	Vaccine carrier	Thermo-meter	Equipment and Tools (A-1, A-2)	Equip ment and Tools (B)	Vehicle
Eastern Province															
CHIPATA	30	0	1	1	2	9	2	1	2	2	30	120	0	1	0
CHADIZA	13	0	1	1	1	3	1	1	2	2	13	52	0	1	0
CHAMA	15	0	1	1	0	4	0	1	2	2	15	60	0	1	0
KATETE	18	0	1	1	1	3	0	1	2	2	18	72	0	1	0
NYMBA	11	0	1	1	0	3	0	1	2	2	11	44	0	1	0
MAMBWE	8	0	1	1	0	2	2	1	2	2	8	32	0	1	0
LUNDAZI	24	0	1	1	2	6	0	1	2	2	24	96	0	1	0
PETAUKE	26	0	1	1	0	4	1	1	2	2	26	104	0	1	0
Lusaka Province															
LUSAKA URBAN	30	0	2	2	29	0	0	2	2	2	30	120	0	1	0
CHONGWE	23	0	1	1	5	1	0	1	2	2	23	92	0	1	0
KAFUE	17	0	1	1	8	7	0	1	2	2	17	68	0	1	0
LUANGWA	11	0	1	1	1	1	1	1	2	2	11	44	0	1	0
Western Province															
KAOMA	19	0	1	1	1	0	14	1	2	2	19	76	0	1	0
KALOBO	15	0	1	1	2	2	4	1	2	2	15	60	0	1	0
LUKULU	14	0	1	1	1	2	1	1	2	2	14	56	0	1	0
MOMGU	29	0	1	1	2	2	9	1	2	2	29	116	0	1	0
SENANGA	15	0	1	1	2	3	5	1	2	2	15	60	0	1	0
SHANGANBO	13	0	1	1	0	2	7	1	2	2	13	52	0	1	0
SESTIEKT	17	0	1	1	2	3	7	1	2	2	17	68	0	1	0
Southern Province															
CHOMA	28	0	1	1	7	3	1	1	2	2	28	112	0	1	0
LIVINGSTONE	13	0	1	1	9	0	0	1	2	2	13	52	0	1	0
GWEMBE	9	0	1	1	2	2	2	1	2	2	9	36	0	1	0
ITEZI-ITEZI	8	0	1	1	1	3	0	1	2	2	8	32	0	1	0
KAZANGULA	15	0	1	1	3	1	1	1	2	2	15	60	0	1	0
KALOMO	22	0	1	1	8	4	1	1	2	2	22	88	0	1	0
MAZABUKA	34	0	1	1	12	4	3	1	2	2	34	136	0	1	0
NAMWALA	12	0	1	1	3	2	0	1	2	2	12	48	0	1	0
SHIAVONGA	13	0	1	1	5	2	1	1	2	2	13	52	0	1	0
SUNZONGWY	13	0	1	1	3	1	0	1	2	2	13	52	0	1	0
MONZE	25	0	1	1	9	7	1	1	2	2	25	100	0	1	0
Central Province															
MUMBWA	21	0	1	1	3	4	1	1	2	2	21	84	0	1	0
SRENJE	16	0	1	1	3	4	0	1	2	2	16	64	0	1	0
KABWE	22	0	1	1	20	0	0	1	2	2	22	88	0	1	0
MKUSHI	16	0	1	1	4	4	0	1	2	2	16	64	0	1	0
KAPIRO-MPOSHI	20	0	1	1	5	1	1	1	2	2	20	80	0	1	0
CHIBOMBO	22	0	1	1	7	4	1	1	2	2	22	88	0	1	0

Province / District	No. of Health Centers	Prefabricated type Walk-in Cold /Freezer room	Icelined refrigerator	Electric Freezer	Electric refrigerator	Kerosene/ Electric refrigerator	Solar refrigerator *system*	Voltage Regulator for compression refrigerators	Large cold box	Small cold box	Vaccine carrier	Thermo-meter	Equipment and tools (A-1, A-2)	Equip ment and Tools (B)	Vehicle
Northern Province															
MPIKA	14	0	1	1	4	4	2	1	2	2	14	56	0	1	0
MBALA	17	0	1	1	5	1	4	1	2	2	17	68	0	1	0
NAKONDE	8	0	1	1	2	2	0	1	2	2	8	32	0	1	0
MPOROKOSO	11	0	1	1	3	2	1	1	2	2	11	44	0	1	0
LUWINGO	9	0	1	1	0	5	1	1	2	2	9	36	0	1	0
KAPUTA	9	0	1	1	1	1	0	1	2	2	9	36	0	1	0
KASAMA	21	0	1	1	8	6	3	1	2	2	21	84	0	1	0
ISOKA	10	0	1	1	0	5	1	1	2	2	10	40	0	1	0
CHILUBI	10	0	1	1	0	4	0	1	2	2	10	40	0	1	0
CHINSALI	15	0	1	1	3	4	0	1	2	2	15	60	0	1	0
MUNGWI	15	0	1	1	0	4	0	1	2	2	15	60	0	1	0
MPULUNGU	8	0	1	1	0	1	1	1	2	2	8	32	0	1	0
Luapula Province															
CHIENGE	6	0	1	1	0	3	1	1	2	2	6	24	0	1	0
MANSA	28	0	1	1	6	9	0	1	2	2	28	112	0	1	0
KWAMBWA	19	0	1	1	3	6	1	1	2	2	19	76	0	1	0
MWENSE	21	0	1	1	7	4	2	1	2	2	21	84	0	1	0
SAMFYA	26	0	1	1	3	4	1	1	2	2	26	104	0	1	0
NCHELNGE	11	0	1	1	1	5	0	1	2	2	11	44	0	1	0
MILENGE	7	0	1	1	0	4	0	1	2	2	7	28	0	1	0
North Western Province															
KABOMPO	15	0	1	1	1	4	0	1	2	2	15	60	0	1	0
KASCMPA	14	0	1	1	2	3	1	1	2	2	14	56	0	1	0
MUTUMBWT	11	0	1	1	0	3	0	1	2	2	11	44	0	1	0
MWINLUNGA	28	0	1	1	2	6	2	1	2	2	28	112	0	1	0
SOLW	42	0	1	1	6	11	2	1	2	2	42	168	0	1	0
ZAMB	11	0	1	1	3	2	1	1	2	2	11	44	0	1	0
CHABUMA	7	0	1	1	0	1	4	1	2	2	7	28	0	1	0
Copperbelt Province															
KALALUSHI	9	0	1	1	7	1	0	1	2	2	9	36	0	1	0
MUFULIRA	16	0	1	1	14	0	0	1	2	2	16	64	0	1	0
LUTUNYAMA	14	0	1	1	3	3	0	1	2	2	14	56	0	1	0
MASATTI	17	0	1	1	2	5	0	1	2	2	17	68	0	1	0
LUANSHYA	20	0	1	1	9	4	0	1	2	2	20	80	0	1	0
MPONGWE	14	0	1	1	4	3	1	1	2	2	14	56	0	1	0
KITWE	34	0	1	1	33	0	0	1	2	2	34	136	0	1	0
CHINGOLA	14	0	1	1	7	0	0	1	2	2	14	56	0	1	0
CHILAMBOMBWE	8	0	1	1	6	0	0	1	2	2	8	32	0	1	0
NDOLA URBAN	48	0	1	1	41	0	0	1	2	2	48	192	0	1	0
Lusaka Central Vaccine Store															
		2	0	16	0	0	0	0	0	0	0	0	1	2	1

There are a number of companies in Japan that can supply prefabricated walk-in cold and freezer rooms, and these companies have prior experience in ODA, so procurement from Japan is possible. For cold chain equipment (freezers, refrigerators, cold boxes, etc.), products that conform to the PIS (Product Information Sheet) standards used by WHO will be procured to regulate equipment for vaccine immunization planning, but because these items are not manufactured domestically in Japan, the products will be procured from a third country. Some of the equipment and tools for the workshops cannot be procured in Japan and will be procured from a third country, along with the equipment and tools for district technicians (B).

The primary sources for equipment procurement are shown in Table 2-6.

Table 2-6. Equipment procurement sources

No.	Equipment name	Local procurement	Procurement from Japan	Procurement from a third country
1	Prefabricated type walk-in cold room		O	
2	Prefabricated type walk-in freezer room		O	
3	Ice-lined refrigerator			O
4	Vaccine/icepack chest freezer			O
5	Electric refrigerator			O
6	Kerosene/electric refrigerator			O
7	Solar refrigerator system			O
8	Voltage regulator for compression refrigerators			O
9	Large cold box			O
10	Small cold box			O
11	Vaccine carrier			O
12	Thermometer			O
13	Equipment and tools A-1 (for the National Workshop)		O	
14	Equipment and tools A-2 (for the National Workshop)			O
15	Equipment and tools B (for district repair technicians)			O
16	Vehicle		O	O

2-2-3 Implementation Policy

2-2-3-1 Implementation Policy

Equipment will be procured from Japan and from third countries, and Japanese corporations will be specified as contractors based on an open competitive bidding system. When items are procured from third countries, a third-party inspection organization will be consigned to conduct a pre-shipment inspection. Engineers will be

dispatched to provide guidance in the installation, setup, and initial operation of the prefabricated walk-in cold and freezer rooms, and the solar refrigerator systems.

The EPI division of MOH Zambia and the National Workshop will serve as the implementing organizations of the project, and will be responsible for distribution and maintenance of the equipment. Training workshops will be held for the purpose of training technicians to handle maintenance and repair. The procurement of equipment and tools will be planned so that they will be available for use at the training workshops.

2-2-3-2 Implementation Conditions

Equipment installation is scheduled to finish before the rainy season, considering the road conditions. Planning will be necessary to ensure that equipment procured from third countries arrives and can be installed in time.

2-2-3-3 Scope of Works

Table 2-7 shows the demarcation of procurement and installation that will be handled by Zambia and by Japan. Zambia will be responsible for distributing equipment other than the prefabricated walk-in cold and freezer rooms and the solar refrigerator systems from the delivery site to the district health offices and the various health centers to Zambia, as well as for training technicians in equipment control.

Table 2-7 Demarcation of obligation

Country Responsible	Contents
Japan	Equipment procurement Transport of equipment to the delivery site Installation of prefabricated walk-in cold and freezer rooms and solar refrigerator systems
Zambia	Distribution of equipment from the delivery site to the target facilities Guidance in equipment maintenance and training of repair technicians (including guidance in the use of equipment and tools)

2-2-3-4 Consultant Supervision

One procurement supervisor will be dispatched from Japan to oversee the overall adjustments of the equipment procured for Zambia, including the allocation and transfer of the equipment. Additionally, one Japanese engineer and one Japanese technician will be dispatched to the local area to install two prefabricated walk-in cold and freezer rooms, to provide initial guidance, and to provide guidance in maintenance. Four persons will also be employed from the local area to install the equipment.

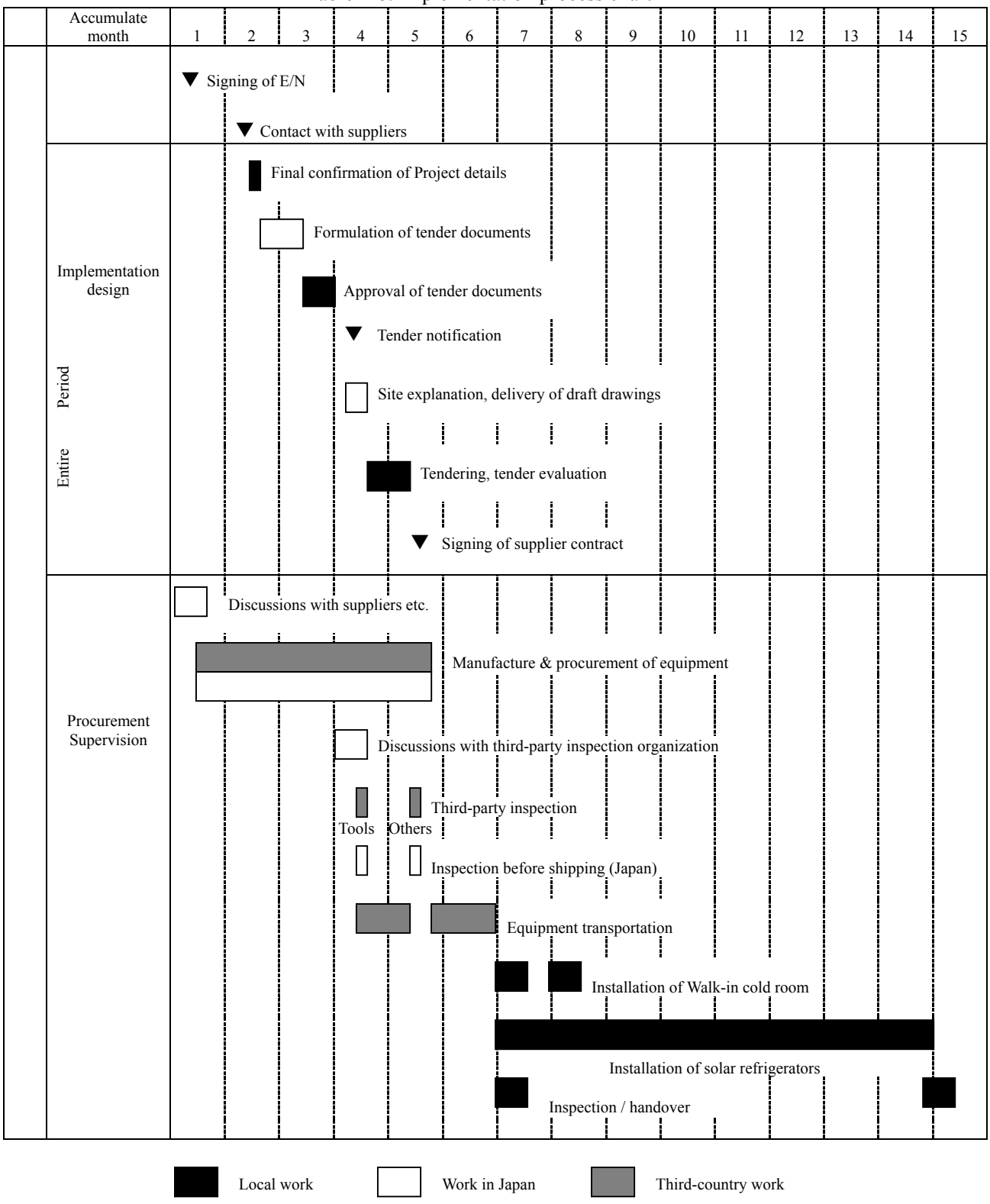
2-2-3-5 Procurement Plan

The cold chain equipment is to be procured from among products that conform to PIS standards, but there are no adequate products in Zambia or Japan, so these will be procured from a third country. Because there are a number of companies in Japan manufacturing prefabricated walk-in cold and freezer rooms, freezers and refrigerators, as well as some of the tools and equipment, these will be procured in Japan. There are also a number of manufacturers in Japan who can supply the vehicle, but one manufacturer has a base in Thailand, so the vehicle will be procured from Japan or Thailand.

Zambia does have dealers who handle spare parts for vehicles, so the access to these parts is not impossible, but considerable time is required to acquire parts, and the cost is high, so there is a possibility that the budget will not extend to covering them. For these reasons, the necessary parts will be procured in sufficient quantities for about two years. For the prefabricated walk-in cold and freezer rooms, the spare parts recommended by the manufacturer will be procured, in the recommended quantities.

2-2-3-6 Implementation Schedule

Table 2-8. Implementation process chart



The scope of implementation for this project extends to the installation of the solar refrigerator systems, so the overall implementation period, assuming extension of the E/N, is set at 19 months, and the handover will be completed by the year 2003.

2-3 Obligations of Recipient Country

Items to be borne by Zambia in the implementation of the project are as stated below.

(1) Zambia will be responsible for assuring that the procured materials and equipment are processed through Customs in an appropriate and timely manner, and for the expenses involved therein.
(2) Zambia will assure the necessary warehouse space for storing the procured materials and equipment.
(3) Zambia will distribute the procured materials and equipment promptly from the warehouse where they are stored to the final domestic destination, and will bear the distribution expenses.
(4) Zambia will be responsible for fees incurred for documents such as notification of Authorization to Payments (A/P) occurring based on the conclusion of Banking Arrangement (B/A) for the implementation of the project.
(5) Zambia will assure the necessary budgetary means and personnel for operation and maintenance of the procured materials and equipment.
(6) Zambia will hold workshops for the purpose of training technicians in the maintenance for the procured materials and equipment.

Expenses to be borne by Zambia are as stated below.

Expenses for transporting the materials and equipment to the final destination, except for prefabricated walk-in cold and freezer rooms: US$ 27,230 (approximately 2.29 million yen)

2-4 Project Operation Plan

The basis of this project is that cold chain equipment procured through the project will be distributed to district health offices and health centers, and used for vaccine storage. Vaccines procured by the EPI division and stored in the Central Warehouse will be moved from the Central Warehouse to the freezers and refrigerators of the various district health offices and kept there. In many cases, the freezers and refrigerators used to store the vaccines are located in district hospitals or ordinary hospitals adjacent to the district health offices, and nurses are in charge of taking care of them. The vaccines are replenished to the health centers in the necessary amounts by the district health office based on weekly (or every two weeks, depending on the region) reports submitted by the health centers on the status of vaccine consumption and the remaining amounts.

There are two types of health centers annexed to clinics: Urban Health Centers (UHC) and Rural Health Centers (RHC). Although it varies depending on the population, generally there is one freezer and one or two refrigerators in a UHC, while RHCs have one refrigerator. These are overseen by one permanently stationed nurse. The nurse checks the temperatures in the freezer(s) and refrigerator(s) twice a day and records them, and judges whether or not the vaccines are being stored appropriately, and whether or not the freezer(s) and refrigerator(s) themselves are capable of controlling the temperature

appropriately. Fluctuations in the volume of vaccines and the results of temperature control are reported to the district health office on a monthly basis. If an equipment breakdown occurs, in case of a simple breakdown, technicians at the health center and district health office repair it, but in cases where complex repairs are required a request for repair is made to the National Workshop through the district health office. Three technicians are employed by the district health office, and these technicians visit the health centers as necessary to check the status of the equipment. Because there is no vehicle at the National Workshop, the vehicle of the district health office is used, and when the repairs have been completed, the equipment is transported back in the same manner, using the vehicle of the district health office, or the NGO vehicle or the private vehicle of the person in charge of the National Workshop. Thus, because no vehicle is available, problems sometimes occur such as delays in transporting equipment to the National Workshop for reparation, and moreover after the equipment is repaired it often ends up being kept at the National Workshop for a long period. By introducing a vehicle to be used specifically for the purpose of transporting equipment, the responsible personnel will be able to visit the location directly from the workshops and carry out maintenance of the equipment directly, and in addition will be able to provide technical instruction to the staff at the health center, making it possible to boost the effectiveness of the maintenance work by training technicians. Consequently, providing a vehicle specifically for the purpose of delivering equipment and for maintenance is considered crucial.

In order to conduct technical training for the repair technicians at the district health offices, training workshops recommended by WHO were held in 1999. The plan was to convene technicians from all of the 72 districts, but because of insufficient budget from MOH, it was only possible to conduct workshops for technicians from 36 districts. Therefore, before the equipment is introduced by the project, training workshops will be held that will include technicians from all of the districts during this fiscal year. As a result, it is believed that both the number of personnel and the technical levels involved in the operation and maintenance have been given sufficient consideration.

Chapter 3 Project Evaluation and Recommendations

3-1 Project Effect

1) Direct effects
   (1) Through this planning, an annual number of approximately 12.88 million doses of vaccines will be controlled at the appropriate temperatures.
   (2) Approximately 1.13 people, consisting of infants under the age of one year and pregnant women, will receive the benefits of appropriate vaccine immunizations.
2) Indirect effects
   (1) By standardizing equipment which to date has included different items, it will be possible to save time and money involved in maintenance.
   (2) The work of moving vaccines from refrigerators that do not control the temperature appropriately to other refrigerators will be eliminated, lightening the workload of nurses, and this is expected to improve health and medical services for the area residents.

3-2 Recommendations

The capability of MOH of Zambia to implement the project is thought to be high, but it is hoped that consideration will be given to the following points.

1) More detailed information, such as maps showing the routes to locations where solar refrigerator systems will be installed and the detailed circumstances of the buildings, such as the roofs of the health centers (including photographs and positional maps that indicate dimensions) should be provided to the technicians setting up the equipment. This will ensure smooth installation and setup.

2) Most of the procured equipment is equipment that the facilities have experience in using, but further guidance should be provided to technicians in the maintenance and repair methods for the various types of equipment.

3) All of the equipment being replaced and discarded uses CFCs, and simply disposing of it will release CFC gases, which can contribute to the destruction of the ozone layer. Future assistance is advisable so that, when disposing of the old equipment, the CFC gases can be recovered and properly treated.

WHO and UNICEF are providing support by holding seminars for medical personnel involved in vaccine immunizations, and are also providing support in the areas of equipment maintenance and guidance in repair technology. MOH itself is also planning to hold technical seminars for this project, so it is thought that adequate technical cooperation is being provided for the project at the current point in time.

5. 討議議事録 (M/D)

MINUTES OF DISCUSSIONS
THE STUDY ON THE PROJECT
FOR
IMPROVEMENT OF EXPANDED PROGRAMME
ON IMMUNIZATION
THROUGH REHABILITATION OF COLD CHAIN
IN
THE REPUBLIC OF ZAMBIA

In response to a request from the Government of the Republic of Zambia (hereinafter referred to as " Zambia"), the Government of Japan decided to conduct a Study on Project for Improvement of Expanded Programme on Immunization through Rehabilitation of Cold Chain (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA").

JICA sent the Study Team (hereinafter referred to as "the Team"), headed by Mr.Katsuhiro Sasaki, Resident Representative of JICA Zambia Office, to Zambia from February 27, 2001 to March 22 , 2001.

The Team held discussions with the officials concerned of the Government of Zambia and conducted a field survey at the study area.

As the result of discussions and the field survey between both sides, the team has confirmed to convey the requested main items as per attached to be considered by the Government of Japan.

Lusaka, March 20,2001

Mr.Katsuhiro SASAKI
Leader, Study Team
Japan International Cooperation Agency
Japan

Dr. Kashiwa Bulaya
Permanent Secretary
Ministry of Health
The Republic of Zambia

Witness

Ms.Musunga Agness
Chief Economist, Bilateral Unit
Ministry of Finance and Economic Development
The Republic of Zambia

ATTACHMENT

1.Objective of the Project

The Project aims to promote the activities for immunization program through the provision of necessary goods.

2.Project site

Project sites are whole of the Republic of Zambia.

3.Responsible and Implementing Agency

The Responsible Agency: Ministry of Health

The Implementing Agency: Central Board of Health

4.Items requested by the Government of Zambia

4-1. After discussions with the Team, the Government of Zambia made a final request to the Government of Japan to consider providing the items described in Annex-1 as part of the Project.

However, items and their numbers to be included in the Project will be decided after further study in Japan.

4-2. The Government of Zambia assigned in Annex-1 their own Priorities on the goods.

A=1st Priority / Essential

B=2nd Priority / Necessary to study

C=3rd Priority / If possible

5.Japan's Grant Aid Scheme

5-1. The Government of Zambia understands the Japan's Grant Aid Scheme explained by the Team, as described in Annex-2.

5-2. The Government of Zambia will take the necessary measures, as described in Annex-3, for smooth implementation of the Project, as a condition for the Japanese Grant Aid to be implemented.

6.Schedule of the Study

JICA will prepare the study report on the Project and send it to the Government of Zambia around August, 2001.

7.Other relevant issues

7-1 All items (except for Solar refrigerators) will be handed over to the Government of Zambia at the Old Medical Stores and other Storages prepared by the Government of Zambia in Lusaka.

Solar refrigerators will be handed over to the Government of Zambia at the Provincial Warehouse in each Provincial Medical Office (or District Warehouse in each District Health Management Office) where Solar refrigerators will be installed.

7-2 The Government of Zambia is requested to allocate the budget to secure the storage room by December 2001 and to secure the space and the security of storage where all items will be placed by January 2002.

7-3 Transportation and Installation costs of Solar refrigerators will be covered by the Japanese Grant Aid. All expenses for the Transportation and Installation of other equipment will be born by the Government of Zambia.

7-4 The Government of Zambia is requested to ensure the clearance of two old walk-in cold rooms situated in the Old Medical Stores, Lusaka at least one month before the construction of the new walk-in cold room. Construction cost of the new cold rooms will be born by the Japanese Grant Aid.

7-5 The Government of Zambia is requested to submit the report including photos to JICA Zambia office every quarter so that JICA Zambia office can confirm the completion of the installation of all the equipment.

7-6 The Government of Zambia requested training of local technicians for installation and maintenance of the cold chain equipment. The team will explore this possibility during and after its study in Zambia. However, it is the responsibility of the Government of Zambia to mobilize the trainees and bear their local costs.

Annex-1

Requested Item

	Item	Q'ty (Original request)	Q'ty (Final request)	Priority
1	Walk-in Cold room with standby generator	2	2	A
2	Solar refrigerators	325	286	A
3	Electric refrigerators	80	73	A
4	Electric refrigerators	100	300	A
5	Electric freezers	80	89	A
6	Kerosene/Electric refrigerators	300	270	A
7	Spare parts for cold chain equipment	1	1	A
8	Large cold box	125	144	A
9	Small cold box	125	144	A
10	Vaccine carrier	1,000	1,244	A
11	Double rack Steam sterilizer	500	0	C
12	Single rack Steam sterilizer	500	0	C
13	Spare parts	1	0	C
14	Solar tube lights 13 watts	350	286	B
15	Spare tube lights	700	286	B
16	Solar panel 75 watt	550	0	C
17	Solar panel 50 watt	450	0	C
18	12 VDC batteries for solar system	150	144	A
19	Thermometer -30 to +50 degrees centigrade	8,000	4,976	A
20	Battery acid	1	0	C
21	Distilled water	1	0	C
22	Kerosene stoves	600	0	C
23	2 plate Cooker for sterilization of syringes and needles	400	0	C
24	Equipment and tools for National Cold Chain Worksho	1	1	A
25	Equipment and tools for Training activities	1	0	C
26	Equipment and tools for district technicians (A)	75	74	B
	Equipment and tools for district technicians (B)	12	0	C
27	4×4 vehicle, Twincab	1	1	A
28	Spareparts for vehicle	1	1	A
29	Computer	1	0	C

A = 1st Priority/Essential, B = 2nd Priority/Necessary to study,
C = 3rd Priority/If possible

	REGION/PROVINCE DISTRICT	*No. of Facilities*	Electric Icelined Refrigerator	Electric Freezer	Electric Refrigerator	Kerosene/Electric Refrigerator	Solar Refrigerator	Total
SOUTH EAST REGION								
	Eastern Province							0
1	CHIPATA	*30*	1	1	1	8	8	19
2	CHADIZA	*13*	1	1	1	3	4	10
3	CHAMA	*15*	1	1	1	3	4	10
4	KATETE	*18*	1	1	1	3	4	10
5	NYMBA	*11*	1	1	0	3	3	8
6	*MAMBWE*	*8*	*1*	*1*	*0*	*2*	*4*	8
7	LUNDAZI	*24*	1	1	2	6	6	16
8	PETAUKE	*26*	1	1	0	4	6	12
	Total	*145*						
	Lusaka Provice							0
9	LUSAKA URBAN	*30*	2	2	29	0	0	33
10	CHONGWE	*23*	1	1	5	1	6	14
11	KAFUE	*17*	1	1	8	7	0	17
12	LUANGWA	*11*	1	1	2	0	3	7
	Total	*81*						
SOUTH WEST REGION								
	Western Province							0
13	KAOMA	*19*	1	1	1	0	14	17
14	KALOBO	*15*	1	1	3	1	5	11
15	LUKULU	*14*	1	1	1	2	3	8
16	MOMGU	*29*	1	1	1	3	13	19
17	SENANGA	*15*	1	1	4	0	5	11
18	SHANGANBO	*13*	1	1	0	2	9	13
19	SESTIEKT	*17*	1	1	2	3	9	16
	Total	*122*						
	Southern Province							0
20	CHOMA	*28*	1	1	7	3	5	17
21	LIVINGSTONE	*13*	1	1	9	0	0	11
22	GWEMBE	*9*	1	1	2	2	4	10
23	ITEZI-ITEZI	*8*	1	1	2	2	2	8
24	KAZANGULA	*15*	1	1	3	1	7	13
25	KALOMO	*22*	1	1	8	4	4	18
26	MAZABUKA	*34*	1	1	12	4	5	23
27	NAMWALA	*12*	1	1	3	2	3	10
28	SHIAVONGA	*13*	1	1	5	2	2	11
29	SUNZONGWY	*13*	1	1	4	1	4	11
30	MONZE	*25*	1	1	9	7	6	24
	Total	*192*						
NORTH CENTRAL REGION								
	Central Province							0
31	MUMBWA	*21*	1	1	3	4	5	14
32	SRENJE	*16*	1	1	3	*4*	4	13
33	KABWE	*22*	1	1	20	0	1	23
34	MKUSHI	*16*	1	1	6	2	6	16
35	KAPIRO-MPOSHI	*20*	1	1	5	1	5	13
36	CHIBOMBO	*22*	1	1	10	5	5	22
	Total	*117*						
	Northern Province							0
37	MPIKA	*14*	1	1	2	5	3	12
38	MBALA	*17*	1	1	4	2	4	12
39	NAKONDE	*8*	1	1	2	2	2	8
40	MPOROKOSO	*11*	1	1	3	2	2	9

Annex 1-2

	REGION/PROVINCE DISTRICT	*No. of Facilities*	Electric Icelined Refrigerator	Electric Freezer	Electric Refrigerator	Kerosene/Electric Refrigerator	Solar Refrigerator	Total
41	LUWINGO	*9*	1	1	0	5	2	9
42	KAPUTA	*9*	1	1	2	0	3	7
43	KASAMA	*21*	1	1	8	*5*	*4*	19
44	ISOKA	*10*	1	1	0	4	4	10
45	***CHILUBI***	***10***	*1*	*1*	***0***	*4*	*6*	12
46	CHINSALI	*15*	1	1	3	4	4	13
47	MUNGWI	*15*	1	1	0	4	0	6
48	MPULUNGU	*8*	1	1	0	1	1	4
	Total	*147*						
NORTH WEST REGION								
	Luapula Province							0
49	***CHIENGE***	*6*	*1*	*1*	***0***	*3*	*1*	6
50	MANSA	*28*	1	1	6	9	8	25
51	KWAMBWA	*19*	1	1	3	6	4	15
52	MWENSE	*21*	1	1	7	4	4	17
53	SAMFYA	*26*	1	1	2	5	5	14
54	NCHELNGE	*11*	1	1	1	5	4	12
55	MILENGE	*7*	1	1	0	*4*	*2*	8
	Total	*118*						
	North Western Province							0
56	KABOMPO	*15*	1	1	1	4	5	12
57	KASCMPA	*14*	1	1	2	3	4	11
58	MUFUMBWE	*11*	1	1	0	3	3	8
59	MWINLUNGA	*28*	1	1	2	6	10	20
60	SOLWEZI	*42*	1	1	6	12	13	33
61	ZAMBEZI	*11*	1	1	3	2	2	9
62	***CHABUMA***	*7*	*1*	*1*	***0***	*2*	*4*	8
	Total	*128*						
	Copperbelt Province							0
63	KALALUSHI	*9*	1	1	7	0	0	9
64	MUFULIRA	*16*	1	1	14	0	0	16
65	LUTUNYAMA	*14*	1	1	4	2	2	10
66	MASATTI	*17*	1	1	2	5	2	11
67	LUANSHYA	*20*	1	1	8	3	0	13
68	MPONGWE	*14*	1	1	4	3	4	13
69	KITWE	*34*	1	1	31	0	0	33
70	CHINGOLA	*14*	1	1	9	2	0	13
71	CHILAMBOMBWE	*8*	1	1	4	0	0	6
72	***NDOLA URBAN***	*48*	*1*	*1*	*31*	*10*	***0***	43
	Total	*194*						
	Total No. of facilities	*1244*						
	LUSAKA OLD MEDICAL STORES (Central Stores)		0	16	0	0	0	16
	Total		*73*	*89*	*344*	*226*	*286*	*1,018*
	Requested number by MOH		*73*	*89*	*300 (instead of*	*270 (instead of*	*286*	*1,018*

*Note : The difference between the number of "Total" and "Requested number of MOH" for Electric Refrigerator and E/K Refrigerator is made by MOH's request according to their Five Year Cold Chain Rehablilitation Plan.

Japan's Grant Aid Program

1. Japan's Grant Aid Procedures

(1) The Japan's Grant Aid Program is executed by the following procedures.

Application (request made by a recipient country)
Study (Study conducted by JICA)
Appraisal & Approval (appraisal by the Government of Japan and approval by the Cabinet of Japan)
Determination of Implementation (Exchange of Notes between both Governments)
Implementation (implementation of the Project)

(2) Firstly, an application or a request for a Grant Aid project submitted by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to determine whether or not it is eligible for Japan's Grant Aid. If the request is deemed appropriate, the Government of Japan assigns JICA to conduct a study on the request.

Secondly, JICA conducts the study, using (a) Japanese consulting firm(s).

Thirdly, the Government of Japan appraises the project to see whether or not it is suitable for Japan's Grant Aid Program, based on the Basic Design Study Report prepared by JICA and the results are then submitted to the cabinet for approval.

Fourth, the project approved by the cabinet becomes official with the Exchange of Notes signed by the Government of Japan and the recipient country.

Finally, for the implementation of the Project, JICA assists the recipient country in preparing contracts and so on.

2. Contents of the Study

(1) Contents of the Study

The purpose of the Basic Design Study conducted by JICA on a requested project is to provide a basic document necessary for appraisal of the project by the Japanese Government. The contents of the Study are as follows:

a) confirmation of the background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,

b) evaluation of the appropriateness of the project for the Grant Aid Scheme from a technical, social and economical point of view,

c) confirmation of items agreed on by the both parties concerning a basic concept of the project,

d) preparation of a basic design of the project,

e) estimation of cost of the project.

The contents of the original request are not necessarily approved in their initial form as the contents of the Grant Aid project. The Basic Design of the project is confirmed considering the guidelines of Japan's Grant Aid Scheme.

Final project components are subject to approval by the Government of Japan and therefore may differ from an original request. Implementing the project, the Government of Japan requests the recipient country to take necessary measures involved which are itemized on Exchange of Notes.

(2) Selection of Consultants

For smooth implementation of the study, JICA uses (a) registered consulting firm(s). JICA selects (a) firm(s) based on the proposals submitted by the interested firms. The firm(s) selected carry(ies) out a Basic Design Study and write(s) a report, based upon terms of reference set by JICA.

The consulting firm(s) used for the study is (are) recommended by JICA to a recipient country after Exchange of Notes, in order to maintain technical consistency and also to avoid any undue delay in implementation should the selection process be repeated.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds to procure the equipment and services (engineering services and transportation of the products, etc.) for economic and social development of the country under principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not supplied through the donation of materials or such.

(2) Exchange of Notes (E/N)

Both Governments concerned extend Japan's Grant Aid in accordance with the Exchange of Notes in which the objectives of the Project, period of execution, conditions and amount of the Grant Aid etc., are confirmed.

(3) "The period of the Grant Aid" means one Japanese fiscal year which the Cabinet

approves the Project for. Within the fiscal year, all procedure such as Exchange of Notes, concluding a contract with (a) consulting firm(s) and (a) contractor(s) and a final payment to them must be completed.

(4) Under the Grant, in principle, products and services of origins of Japan or the recipient country are to be purchased.

When the two Governments deem it necessary, the Grant may be used for the purchase of products or services of a third country.

However the prime contractors, namely, consulting, contractor and procurement firms, are limited to "Japanese nationals". (The term "Japanese nationals" means persons of Japanese nationality or Japanese corporations controlled by persons of Japanese nationality.)

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude contracts denominated in Japanese yen with Japanese nationals. The Government of Japan shall verify those contracts. The "Verification" is deemed necessary to secure accountability to Japanese tax payers.

(6) Undertakings Required to the Government of the Recipient Country

In the implementation of the Grant Aid project, the recipient country is required to undertake such necessary measures as the following:

a) to secure land necessary for the sites of the project prior to the installation work in case the project is providing equipment,

b) to provide facilities for distribution of electricity, water supply and drainage and other incidental facilities in and around the sites,

c) to secure buildings prior to the installation work in case the project is providing equipment,

d) to ensure all the expenses and prompt execution for unloading, customs clearance at the port of disembarkation and internal transportation of the products purchased under the Grant Aid,

e) to exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which will be imposed in the recipient country with respect to the supply of the products and services under the Verified Contracts,

f) to accord Japanese nationals whose services may be required in connection with the supply of the products and services under the Verified Contracts, such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work.

(7) Proper Use

The recipient country is required to maintain and use the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for the operation and maintenance as well as to bear all expenses other than those covered by the Grant Aid.

(8) Re-export

The products purchased under the Grant Aid shall not be re-exported from the recipient country.

(9) Banking Arrangement (B/A)

a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in a bank in Japan. The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the Verified Contracts.

b) The payments will be made when payment requests are presented by the bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

Annex-3

Major Undertakings to be Taken by Each Government

NO	Items	To be covered by the Grant Aid	To be covered by the Recipient side
1	To bear the following commissions to a bank of Japan for the banking services based upon the B/A		
	1) Advising commission of A/P		●
	2) Payment commission		●
2	To ensure prompt unloading and customs clearance at the port of disembarkation in recipient country		
	1) Marine(Air) transportation of the products from Japan to the recipient country	●	
	2) Tax exemption and custom clearance of the products at the port of disembarkation		●
	3) Internal transportation from the port of disembarkation to the project site	(●)	(●)
3	To accord Japanese nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the recipient country and stay therein for the performance of their work		●
4	To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the recipient country with respect to the supply of the products and services under the verified contract		●
5	To maintain and use properly and effectively the facilities constructed and equipment provided under the Grant Aid		●
6	To bear all the expenses, other than those to be borne by the Grant Aid, necessary for the transportation and installation of the equipment		●

NOTE

THE STUDY ON THE PROJECT
FOR
IMPROVEMENT OF EXPANDED PROGRAMME
ON IMMUNIZATION
THROUGH REHABILITATION OF COLD CHAIN
IN
THE REPUBLIC OF ZAMBIA

For the purpose of the smooth implementation of the Project, JICA requests the Ministry of Health of the Republic of Zambia

1. To submit a list of the names of health centers which will receive the equipment.
   (The list will be required by July 2001.)

2. To submit the names and locations of warehouses in Provinces (or Districts) in which to store Solar refrigerators.
   (The list will be required **by end of April, 2001**)

3. To submit the names of officers in charge of managing storages in Province (or Districts).
   (The list will be required by July 2001.)

4. To submit the detailed curriculum, costing and confirmation of allocated budget for training of local technicians for installation and maintenance of the cold chain equipment. This information is necessary to examine the possibilities of covering the cost for related consultancies by the Japanese Grant Aid.
   (The list will be required **by end of April, 2001**)

Lusaka, March 20,2001

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