Ministry of Public Health
The Republic of Yemen

STUDY REPORT
ON
THE PROJECT FOR GRANT AID FOR CHILD HEALTH, IMPROVEMENT OF COLD CHAIN SYSTEM
IN
THE REPUBLIC OF YEMEN

JANUARY 1999

JAPAN INTERNATIONAL COOPERATION AGENCY

PREFACE

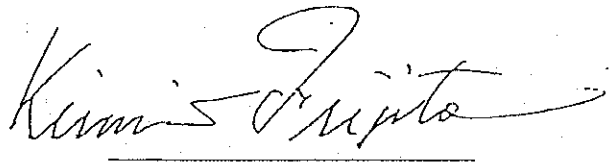
In response to a request from the Government of the Republic of Yemen, the Government of Japan decided to conduct a study on the Project for Grant Aid for Child Health, Improvement of Cold Chain System and entrusted the Japan International Cooperation Agency (JICA) to conduct the study with the assistance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

JICA sent to Yemen a study team from October 3 to October 18, 1998.

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 Yemen for their close cooperation extended to the team.

January 1999



Kimio Fujita
President
Japan International Cooperation Agency

Table of Contents

Location Map/Perspective

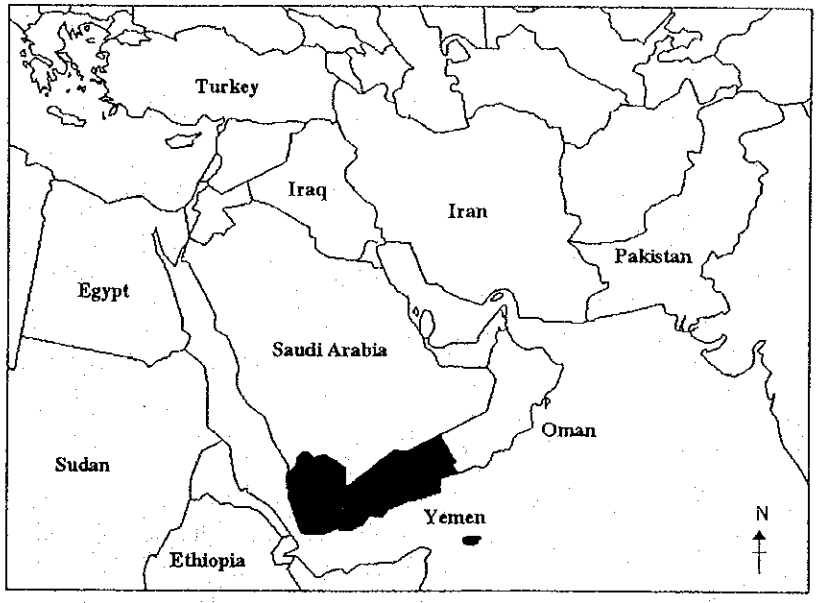
Abbreviations

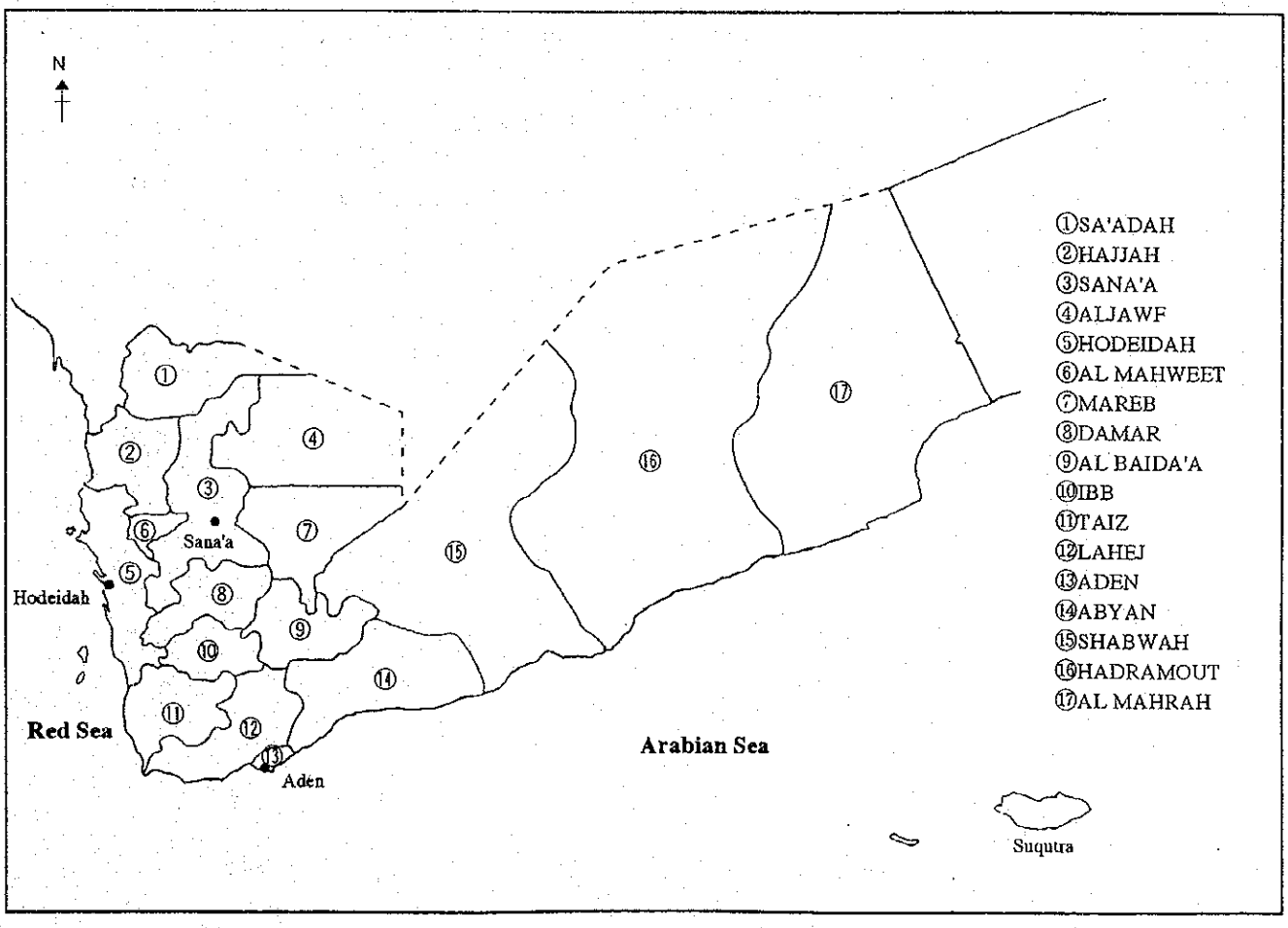
Page

Chapter 1 Background of the Project ---- 1
1.1 Circumstances of the Request ---- 1
1.2 Contents of the Request ---- 2
Chapter 2 Contents of the Project ---- 4
2.1 Objectives of the Project ---- 4
2.2 Basic Concept of the Project ---- 4
2.3 Basic Design ---- 8
2.3.1 Design Concept ---- 8
2.3.2 Basic Design ---- 12
Chapter 3 Implementation Plan ---- 16
3.1 Implementation Plan ---- 16
3.1.1 Implementation Schedule ---- 16
3.1.2 Obligations of recipient country ---- 16
3.2 Operation and Maintenance Plan ---- 17
Chapter 4 Project Evaluation and Recommendation ---- 19
4.1 Project Effect ---- 19
4.2 Recommendation ---- 21

(Appendices)

1. Member List of the Survey Team
2. Survey Schedule
3. List of Party Concerned in the Recipient Country
4. Minutes of Discussion


Turkey
Iraq
Iran
Pakistan
Egypt
Saudi Arabia
Oman
Sudan
Yemen
Ethiopia
N


N
①SA'ADAH
②HAJJAH
③SANA'A
④ALJAWF
⑤HODEIDAH
⑥AL MAHWEET
⑦MAREB
⑧DAMAR
⑨AL BAIDA'A
⑩IBB
⑪TAIZ
⑫LAHEJ
⑬ADEN
⑭ABYAN
⑮SHABWAH
⑯HADRAMOUT
⑰AL MAHRAH
Sana'a
Hodeidah
Red Sea
Aden
Arabian Sea
Suqutra

Abbreviations

AFP	Acute Flaccid Paralysis
BCG	Bacillus Calmette-Guerin
CDC	Centers for Disease Control
CFC	Chloro Fluoro Carbon
DPT	Diphtheria, Pertussis, Tetanus
EC	European Community
EPI	Expanded Programme on Immunization
GTZ	Gasellschaft fuer Technische Zusammenarbeit
IMF	International Monetary Fund
NIDs	National Immunization Days
PHC	Primary Health Care
ROTARY	International Rotary Club
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Chapter 1 Background of the Project

1-1 Circumstances of the Request

The present health situation of the Republic of Yemen (to be referred as "Yemen" hereafter) is far behind the world standard. Especially, the mortality of infants is extremely high with approximately 80 among 1,000 births and 105 among 1,000 births of less than five years old. Main causes of death include the diseases that can be prevented by vaccinations.

The EPI of Yemen started in 1977, which raised the vaccination rate of the infants of less than one year old to 74% by 1990. However since the unification of the nation in 1990, the routine vaccination[1] rate dropped to 40% by 1993 because of budgetary problems, reduction of supports from donors caused by the Gulf War, and the difficulty of supply and continuation. For this reason, the government of Yemen held a joint conference on EPI with the cooperation of international organizations or supporting organizations of overseas countries, in which they confirmed the necessity of radical improvement of the entire system including the cold chain system[2].

Based on the above mentioned conference, the National EPI Master Plan 1996 to 2000 was formulated and the government of Yemen appointed the EPI as the public health program with priority. However with the occurrence of the civil war that started during the course of this process, the situation has worsened further and the plan is difficult to continue without the supports of overseas countries at present. The government of Yemen established a National Coordinating Committee on EPI to secure the funds for the program. Thus the international organizations such as the WHO and UNICEF as well as foreign countries including Japan are cooperating for this program as the main donors.

As a part of this cooperation, Japan has been supporting the preparation of cold chain system mainly consisting of upper level vaccine warehouses with the WHO as the technical cooperation project (Special Equipment as the Measures for Infectious Disease of 1997).

With the influence of the NIDs started from 1996, the routine vaccination rate is gradually recovering now. However compared with the underdeveloped countries with similar economic situations, the vaccination rate is still low and the actual routine vaccination rate is assumed to be 50 to 60%.

---

[1] Vaccination conducted on regular basis

[2] Vaccine supply system from the central to peripheral facilities

Under the above mentioned circumstances, the government of Yemen formulated this Project and requested Japan for the procurement of cold chain equipment in order to promote the preparation of cold chain system to be extended to peripheral health centers and health units as well as to strengthen the systematic system.

1-2 Contents of the Request

The government of Yemen has been implementing the EPI on six diseases: tuberculosis, diphtheria, whooping cough, poliomyelitis, measles, and tetanus. This project has an objective to procure the equipment necessary for preparing the cold chain system. The facilities actually covered by this Project include the vaccine warehouses of central government, states, and counties as well as the EPI spots at hospitals, health centers, and health units which are actually implementing vaccination activities with the highest priority. The requested equipment is shown in Table 1, in which the requested priorities are as follows; A represents "essential", B "necessary", and C "desirable".

Table 1 Contents of the Request

Classification	No.	Requested equipment	Amount	Use	Priority
Cooling equipment	1.	Refrigerator and freezer of solar system (L)	30	To be used for storing a large amount of vaccines and manufacturing ice packs at the county warehouses where the procurement of electricity and gas is difficult.	A
	2.	Refrigerator and freezer of gas system (L)	150	To be used for storing the vaccines at the lower level facilities where the procurement of electricity is difficult.	A
	3.	Freezer for ice packs	10	Freezer exclusive for ice packs which will be used at the state warehouses that need a large amount of ice packs	B
	4.	Ice-line refrigerator (L)	30	To be used for storing vaccines at the upper level warehouses having frequent electric failure	A
	5.	Ice-line refrigerator (S)	200	To be used at the lower level facilities having the same situation as mentioned above	A
	6.	Refrigerator and freezer of solar system (S)	160	To be used for storing a small amount of vaccines and manufacturing ice packs at the lower level facilities where the procurement of electricity and gas is difficult.	A
Accessories	7.	Constant-voltage device	200	To be used attached to the cooling equipment in order to prevent the trouble or deterioration of refrigerators caused by unstable power situation	B
	8.	Thermometer (Round)	1,500	To be used mainly by freezers for proper temperature control	A
	9.	Thermometer (Vertical)	1,500	To be used mainly by refrigerators for proper temperature control	A
Transportation equipment	10.	Cold box	570	To be used to transport a large amount of vaccines for long distance	B
	11.	Vaccine carrier	1,000	To be used to transport a small amount of vaccines for short distance	B
	12.	Vaccine transport cooler vehicle	2	To be used to transport vaccines and related equipment from the central warehouse to state warehouses	A
	13.	Truck with a special cabin	2	To be assigned to the workshop and used for maintaining the equipment and moving the troubled equipment	A
	14.	Manual forklift	1	To be used for loading and unloading the equipment at the central warehouse	C

Chapter 2 Contents of the Project

2-1 Objectives of the Project

The government of Yemen considers the EPI as the health development subject of priority and has declared to achieve the following four items by 2,000 in the National EPI Master Plan 1996 - 2000 as its objectives.

i. To raise the vaccination rate of infants of less than one year old to 90%
ii. To reduce the cases of death by measles to 95% of that in 1990 and the morbidity to 90%
iii. To eradicate the poliomyelitis
iv. To suppress the tetanus in newborn babies

In order to achieve the objectives mentioned above, the Ministry of Public Health has started the gradual preparation of cold chain system because it considers the drastic reform of cold chain system is indispensable. Preparation will be conducted for the vaccine warehouses of central and state levels first, then those of county level, and the peripheral EPI spots as the last stage.

However, the government of Yemen has difficulty in the budgetary measures to purchase the equipment for implementing the plan mentioned above, and the implementation solely by the government of Yemen is considered to take a long time. On the other hand, because the delay of the preparation of the essential equipment will give fatal trouble for the smooth implementation of EPI, the WHO and the Japanese government implemented partial preparation of the equipment to the upper level warehouses of central to county warehouses. However these supports were conducted as the measures for emergency purpose only and satisfied only a part of the preparation of the plan. Therefore, a further preparation is necessary.

In this Project, the cold chain equipment will be prepared for the upper level vaccine warehouses which were not prepared and the peripheral level EPI facilities such as hospitals and health centers with the objectives to reform and strengthen the systematic system.

2-2 Basic Concept of the Project

Vaccinations are quite effective for their costs in the field of public health and are said as one of the most influential approaches. For this reason, approximately 80% of the entire children of the world have received vaccinations for six diseases including tuberculosis, diphtheria,

whooping cough, poliomyelitis, measles, and tetanus at present. In Yemen, the EPI was started in 1977 and the vaccination rate of the infants of less than one year old reached 74% by the beginning of 1990s. However, from then on, with the influence of the national and economic confusions extending over long period of time, the vaccination rate is considered to be changing at 50 to 60% now.

In order to improve the above mentioned present state, the EPI headquarters conducted a survey on the facilities and equipment of the entire country in 1997 for the purpose of reviewing the entire cold chain system. Based on the results, some of the existing equipment of some warehouses of central, county, and state levels, which were substantial for the cold chain system, were replaced with the supports of the WHO and Japan, considering easiness of maintenance and appropriateness to circumstances. At the same time, the refrigerators (freezers) of CFC free or solar type were positively introduced.

This Project will cover the warehouses of central and county levels not covered by the above mentioned supports and the EPI facilities established thereafter. The warehouses and facilities to be included in this Project shall be the existing ones and the troubled or deteriorated equipment shall be replaced or expanded. Therefore, no equipment shall be allocated to the facilities to be constructed in the future and the spare items shall not be included in this Project. The Project areas shall be all the seventeen states and Sana'a city. However because not all the facilities cannot be covered, the facilities having the above mentioned problems will be given priority as necessary based on the results of the "facilities and equipment study".

As for the contents of the equipment, because all items are indispensable for the EPI except for the requested manual forklift and conform to the preparation plan to be promoted by Yemen, they shall be included in the Project. Although the necessity of manual forklift is understandable, it shall be excluded from this Project because it is not directly related to the EPI and should be originally handled as the equipment belonging to the warehouse.

The requested truck is a model having a spare seat behind the driver seat. However because the requested one is a special model and not popular, as well as the loading space cannot be sufficiently secured, a normal model with a single cabin shall be examined.

With regard to the amount of each item, the amount of cooling equipment shall be estimated based on the "facilities and equipment study" and other equipment shall be estimated from the data shown in Table 2. The amount of the items to be prepared shall be one for each facility as a rule except for the vaccine warehouse.

Table 2 Reparation ratio of equipment calculated from the number of items

Cold chain equipment		No. of existing items	No. of necessary items	Planned No. of items	Preparation ratio	Remark
Cooling equipment	Electric refrigerator	261	500	230	46%	Facilities shall be selected according to the facility and equipment study (the latest version).
	Gas refrigerator	981	215	150	70%	
	Solar refrigerator	88	320	190	59%	
	Freezer for ice packs	84	10	10	100%	
Accessories	Constant-voltage device	31	200	200	100%	Especially in the areas where the electric situation is poor, this device shall be prepared as the accessory of refrigerator (freezer) for the technical cooperation project (60 devices) and for this Project (240 devices).
	Thermometer (Round)	433	1,500	1,500	100%	The number is calculated by extracting the number of existing thermometers from the number of entire facilities. One thermometer shall be prepared to each facility.
	Thermometer (Vertical)	532	1,500	1,500	100%	Same as above.
Transportation equipment	Cold box	1,398	1070	570	53%	Half of the necessary number shall be prepared.
	Vaccine carrier	3,324	2,000	1,000	85%	Because half of the existing carriers are deteriorated, 1000 carriers excluding the 700 carriers supplied by the UNICEF shall be prepared. The preparation rate is calculated including the ones procured by the UNICEF.
	Vaccine transport cooler vehicle	3	2	2	100%	One each vehicle shall be allotted to Sana'a and Aden.
	Truck	2	4	2	50%	Same as above.

Source: EPI Section of the Ministry of Public Health

Notes:

Number of existing items: The number of existing items including the troubled and deteriorated ones and the ones supplied by the WHO and Japan

Number of necessary items: The number of items necessary for the preparation at present based on the "facilities and equipment study" and corrected by reducing the ones supplied by the WHO and Japan thereafter

Planned number of items: The number of cooling equipment is calculated by classifying the refrigerators (freezers) into electric, gas, solar, and the ones exclusive for ice packs regardless of the capacity for the convenience's sake.

Preparation ratio: The ratio of the planned number of items against the necessary one.

Table 3 Equipment distribution plan for each facility

		Central warehouse	State warehouse	County warehouse	Hospital	Health center	Health unit	Total
Total No. of facilities		2	19	169	89	554	1,334	2,167
Cooling equipment	1 Refrigerator and freezer of solar system (L)			30				30
	2 Refrigerator and freezer of gas system					46	104	150
	3 Freezer for ice packs of electric system	2	8					10
	4 Ice line refrigerator of electric system (L)	2	26	2				30
	5 Ice line refrigerator of electric system (S)				21	118	61	200
	6 Refrigerator and freezer of solar system (S)			16	3	59	82	160
Accessories	7 Constant-voltage device	200						200
	8 Thermometer (Round)	1,500						1,500
	9 Thermometer (Vertical)	1,500						1,500
Transportation equipment	10 Cold box			570				570
	11 Vaccine carrier					1000		1,000
	12 Vaccine transport cooler vehicle	2						2
	13 Truck with a special cabin	2						2

Table 3 shows the total number of facilities and the distribution plan of the requested equipment for each facility based on the present state.

Among the vaccine cooling equipment listed as Items 1 to 6, refrigerators and freezers and the ice line refrigerators shall be distributed mainly to the areas where the transportation and the access of residents have been in trouble because of the lack of the absolute number of equipment and the deterioration of equipment. Since many of the facilities in remote areas do not have electricity all the time, not only the electric, but the gas or the solar equipment shall be examined depending on the situation. As a rule, ice line refrigerators shall be distributed to the facilities which can secure electricity, gas refrigerators and freezers shall be distributed to the facilities having difficulty in securing electricity, and solar ones shall be distributed to the facilities having difficulty in securing both electricity and gas. The freezers for ice packs shall be mainly distributed to the state warehouses which need long time for transportation of vaccines because of road situation or wide expansion of area, or which need a large amount of ice packs.

Among the accessories, the constant-voltage device shall be used being attached to the equipment to be procured by this Project in the areas where the equipment has frequent trouble assumed to be caused by voltage fluctuation. As for the thermometer, a minimum of

one set of thermometers consisting of round and vertical ones shall be distributed to each facility as a goal.

With regard to the transportation equipment, half the number of required cold boxes (1,070) shall be planned to be replaced or newly procured. As for the vaccine carrier, more than half of the existing ones (approximately 3,400) are considered to have been deteriorated. However because about 700 ice carriers are planned to be procured by the UNICEF, the remaining 1,000 shall be replaced. As for the vaccine transport cooler vehicle, among the three existing vehicles (one each at Sana'a, Aden, and Hadramawt), the two vehicles at Sana'a and Aden are extremely deteriorated and these two shall be replaced. For the trucks two existing ones belonging to the EPI workshops at Sana'a and Aden shall be replaced. These trucks are widely used for installation, collection, inspection, and repair of the equipment, but both of the existing ones are deteriorated and the number of available days has decreased because of trouble and need much maintenance costs. Thus replacement of these trucks is determined indispensable.

2-3 Basic Design

The basic design of this Project shall be made in accordance with the following design concept by considering the present state of EPI, the cold chain system, and the natural and social conditions of Yemen.

2-3-1 Design Concept

This Project is proceeded as a part of the preparation of cold chain system started by the government of Yemen in 1996, in which the removal of old cold rooms, use of CFC free equipment, standardization of equipment have been started from the upper level warehouses. With regard to the standardization of equipment especially, the EPI headquarters formulated a guideline for the equipment selection under the cooperation of the WHO by referencing to the past data. In this Project, it is desirable to select the equipment in accordance with this guideline. Therefore in selecting the equipment and determining the specifications, care shall be taken not to retrogress the movement of standardization by considering the maintenance and managerial conveniences.

Table 4 Guideline on the selection of cold chain equipment (extract)

Installation environment	Standardized equipment
· Areas where the procurement of electricity and gas is difficult · County warehouses and large-scale health centers	⇨Solar refrigerator (freezer) (L)
· Areas where the procurement of electricity and gas is difficult · Mountainous areas and cold areas · Small-scale county warehouses and health centers	⇨Solar refrigerator (freezer) (S)
· Areas where the procurement of electricity is difficult · Areas where the procurement of gas is difficult · Areas where the outside temperature is between 20 and 35°C	⇨Gas refrigerator (freezer)
· Areas where the procurement of electricity is possible all day long · Vaccine warehouses that need a large amount of ice packs	⇨Freezer of ice packs
· Areas where the continuous procurement of electricity is possible more than eight hours a day · State and county warehouses	⇨Ice-line refrigerator (L)
· Areas where the continuous procurement of electricity is possible more than eight hours a day · Health centers and health units	⇨Ice-line refrigerator (S)

Source: EPI Section of the Ministry of Public Health

The equipment design shall be made based on the above mentioned guideline as the prerequisite and in accordance with the following concept for each condition described below.

(1) Equipment specifications

From the topographic standpoint, Yemen is located between 0 and 3,000 meters above the sea level and stretches from the Temperate to Tropical zones. For this reason, the EPI facilities are established on various environments including seaside, plateau, inland, plain, mountain, desert, and ravine. For the cold chain equipment, temperature control is especially important and all vaccines must be stored within a certain temperature range. Thus the equipment conforming to the environment shall be distributed.

In the same manner, the preparation state of infrastructure is not even. As for the electricity, in some areas, electricity is available for all day long, but in other, it is available only during the night, and there are some other areas where there is no electric facility at all. In addition, while there are areas where gas is available fairly easily as the substitute energy source of electricity, there are other where gas is not available. The cold chain system of Yemen is closely related to the preparation state of infrastructure, and electricity and gas especially constitute the important conditions in selecting the cooling equipment. Because the reform of infrastructure of entire country cannot be expected for a time being, the equipment conforming to the present situation shall be selected.

Preparation of cold chain system has started from the last fiscal year under the cooperation of the WHO and Japan, in which the preparation of approximately a half to two thirds of the upper level facilities including the central and state warehouses have been almost finished. In preparing the equipment for these facilities, because standardized of equipment and use of CFC free items have been promoted at the same time, seven types of refrigerators (freezers) have been used in accordance with the above mentioned natural environment and the state of infrastructure. Standardization of equipment shall be actively examined because it is favorable from the operational and maintenance purposes, as well as because the strengthening of CFC control is inevitable in the future.

(2) Conditions of infrastructure

The electric infrastructure of Yemen cannot be said to have been sufficiently prepared. Even in the metropolitan area, electricity failure occurs frequently and voltage fluctuates greatly. For this reason, it is desirable to attach a constant-voltage device to the equipment that needs continuous operation such as the refrigerator for the purpose of preventing the trouble or deterioration of equipment. Therefore, constant-voltage devises shall be attached to the refrigerators (freezers) distributed to the facilities in the areas where electricity supply is unstable.

(3) Maintenance

Vaccine refrigerators (freezers) originally do not need maintenance. However frequent electric failure and unstable voltage, as well as the high temperature and high humidity environment promote the trouble and deterioration of equipment, causing the temperature control to malfunction. For this reason, compressor and thermostat of electric system, burner and safety device of gas system, as well as panel and cable of solar system may need replacement in some cases.

The EPI headquarters and the WHO implemented a market research of cold chain equipment. As a result, they confirmed that the procurement of replacement parts is possible almost 100% from the manufacturer's agent in the metropolitan Sana'a.

Therefore, in this Project, only the cooling equipment shall be distributed with the parts considered to be necessary from the first and selected so that the parts that may become necessary in the future can be procured easily.

(4) Equipment suppliers

The equipment to be procured by this Project includes vaccine cooling equipment (refrigerator, freezer, cold box, and vaccine carrier), accessories of these equipment (constant-voltage device and thermometer), and vehicle. Among the above mentioned items, the EPI headquarters of Yemen wants to select the vaccine cooling equipment to be procured from the models conforming to the WHO standard. Of these items, procurement from the third countries shall be examined because they are not manufactured at site or in Japan.

The WHO standard models have the following advantages in general.

- They are designed for underdeveloped countries, excel in durability and insulation, and pay consideration to the safety management of vaccines.
- They have been already used for the cold chain system of Yemen. Therefore many maintenance staffs are versed with the operation and maintenance.
- Procurement of replacement parts from local agent or Europe is relatively easy.
- Model change is less frequent and the inventory period of parts is longer than regular parts.

As mentioned before, the climate of Yemen belongs to the Temperate to Tropical zones. However, Yemen consists of various areas since it have areas having high temperature all the year round, areas having significant temperature difference between day and night, and areas that become cold during the winter. Vaccines are broadly classified into those that can be stored below zero temperature and those that must be stored between 0 to 8°C. Therefore, from the standpoint of the safe storage of vaccines, temperature control is one of the most important subjects. Thus the performance of refrigerator is the most important matter to the storage manager. For this reason, home use refrigerators have not been used in Yemen except for those procured urgently immediately after the dispute between the South and the North because the temperature control is difficult due to thin insulation, the inside temperature is uneven, the inside temperature cannot be understood from outside, and no measures for electric failure is provided.

(5) Equipment transportation

Both the equipment to be procured from Japan or the third countries shall be transported by sea and delivered to the government of Yemen at Al Hodeidah Harbor, which is the harbor of international commerce of Yemen. Then the equipment shall be transported to Sana'a, where it shall be stored at the central warehouse of the Ministry of Public Health. Just like the technical cooperation project mentioned before, the transportation is planned to be conducted in rush back and forth manner using two trucks owned by the Ministry of Public Health. The equipment to be procured by this Project is larger in quantity than the one in the above mentioned technical cooperation project, and yet the storage capacity of warehouse is limited.

Thus the delivery shall be divided into two to three times and the delivery time shall be adjusted not to be same.

(6) Training

The equipment the installation, operation, and maintenance of which need training is the solar refrigerator and freezer only. In Yemen, twelve workshop engineers have already received a training from manufacturer in this fiscal year[1] under the technical cooperation project of Japan. Thus a further training is not necessary. However by considering the fact that thirty-two among thirty-five refrigerators are operating normally, but the remaining three are not operating normally due to technical problems[2], training by the manufacturer shall be included in this Project. The contents of the training shall place more importance on the actual installation and maintenance because a wide rage of training was already conducted by the above mentioned manufacturer ranging from the basic (principle) of solar system to the installation.

2-3-2 Basic Design

The amount, specifications, use of the equipment to be procured by this Project are shown in Table 5.

[1] A training was implemented by the manufacturer for two weeks in July 1998.

[2] Do not operate properly. When this study was conducted, the cause was being explored by the Yemen side.

Table 5 Contents and the scale of the grant aid

Classification	No.	Requested equipment	Amount	Specifications	Use
Cooling equipment	1.	Refrigerator and freezer (L)	30	Solar Refrigerator: Approx.110 liter Freezer: Approx. 70 liter	To be used for storing a large amount of vaccines and manufacturing ice packs at the county warehouses where the procurement of electricity and gas is difficult.
	2.	Refrigerator and freezer	150	Gas Refrigerator: Approx. 10 liter Freezer: Approx. 1.5 liter	To be used mainly for storing vaccines at the lower level facilities where the procurement of electricity is difficult.
	3.	Freezer for ice packs	10	Electric Freezer: Approx. 140 liter	Freezers exclusive for ice packs will be used at the state warehouses that need a large amount of ice packs.
	4.	Ice-line refrigerator (L)	30	Electric Refrigerator: Approx. 60 liter	To be used for storing vaccines at the upper level warehouses having frequent electric failure.
	5.	Ice-line refrigerator (S)	200	Electric Refrigerator: Approx. 20 liter	To be used at the lower level facilities having the same situation mentioned above.
	6.	Refrigerator and freezer (S)	160	Solar Refrigerator: Approx. 30 liter Freezer: Approx. 30 liter	To be used for storing a small amount of vaccines and manufacturing ice packs at the lower level facilities where the procurement of electricity and gas is difficult.
Accessories	7.	Constant-voltage device	200	500 W	To be used attached to the cooling equipment to prevent the trouble or deterioration of refrigerators caused by unstable power situation.
	8.	Thermometer (Round)	1,500	-30°C to 30°C	To be used mainly by freezers for proper the purpose of temperature control.
	9.	Thermometer (Vertical)	1,500	-30°C to 30°C	To be used mainly by refrigerators for the purpose of proper temperature control.
Transportation equipment	10.	Cold box	570	Capacity: Approx. 20 liter	To be used to transport a large amount of vaccines for a long distance.
	11.	Vaccine carrier	1,000	Capacity: Approx. 1.7 liter	To be used to transport a small amount of vaccines for a short distance.
	12.	Vaccine transport cooler vehicle	2	Four wheel drive Diesel	To be used to transport vaccines and related equipment for a long distance from the central warehouse to state warehouses
	13.	Truck	2	Four wheel drive Diesel	To be allocated to the workshop and used for maintaining the equipment and moving the troubled equipment.

Among the planned equipment, items using CFC free coolant gas shall be examined for the cold boxes and vaccine carriers of cooling equipment.

The number of facilities to be prepared by this Project to each state and the number of cooling equipment to be distributed are shown in Table 6.

Table 6 Equipment distribution plan to each state

State	Central warehouse	State warehouse	County warehouse	Hospital	Health center	Health unit	Electric refrigerator		Gas refrigerator	Solar refrigerator		Freezer
							L	S		L	S	
Sana'a		1	8	0	21	25	3	21	35	8	25	1
Sana'a city	1	1	0	5	23	0	1	28	0	0	0	1
Taiz		1	5	2	30	21	2	17	25	5	11	1
Ibb		1	8	3	26	8	1	14	15	5	12	1
Al Hodeidah		1	6	0	19	6	1	18	0	4	9	1
Hajjah		1	5	1	7	19	2	2	16	5	9	0
Dhamar		1	1	0	17	18	2	12	13	1	10	0
S'aadah		1	1	2	0	16	1	2	12	1	4	0
Al Beida		1	1	1	10	17	2	4	17	0	8	0
Al Mahwit		0	3	0	0	13	0	0	8	1	7	0
Marib		1	6	0	7	2	1	3	6	0	6	0
Aljawf		0	0	0	4	3	0	0	3	0	4	0
Aden		1	0	0	0	9	0	2	9	0	0	0
Hadramawt		2	0	0	13	28	4	27	0	0	14	2
Lahej		1	1	3	8	17	3	12	0	0	16	1
Abyan		1	1	2	6	19	2	16	0	0	11	1
Shabwah		1	0	5	5	16	2	15	0	0	11	0
Al Maharah		1	1	0	0	2	1	0	0	0	3	0
Total	2	16	47	24	205	230	30	200	150	30	160	10

The destinations of the equipment planned by this Project and the causes for selection are shown in Table 7.

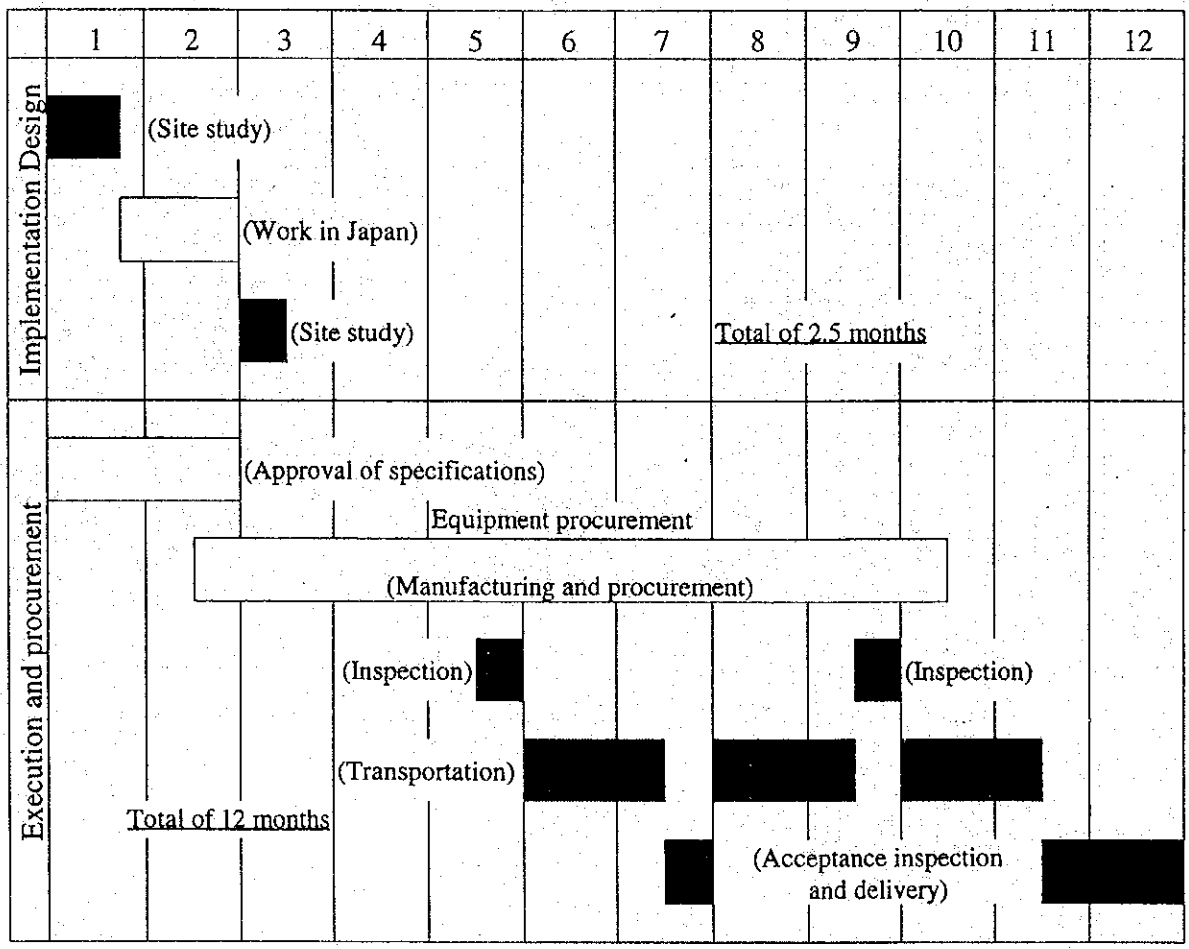
Table 7 Equipment suppliers

Classification	No.	Requested equipment	Project site	Japan	Third country	Cause for selection
Cooling equipment	1.	Refrigerator and freezer (L)			□	Those conforming to the WHO standard are desirable, but they are not manufactured in Japan.
	2.	Refrigerator and freezer			□	
	3.	Freezer for ice packs			□	
	4.	Ice-line refrigerator (L)			□	
	5.	Ice-line refrigerator (S)			□	
	6.	Refrigerator and freezer (S)			□	
Accessories	7.	Constant-voltage device	□			Those manufactured in Japan having no quality problems are distributed at site.
	8.	Thermometer (Round)			□	Those conforming to the WHO standard are desirable, but they are not manufactured in Japan.
	9.	Thermometer (Vertical)			□	
Transportation equipment	10.	Cold box			□	
	11.	Vaccine carrier			□	
	12.	Vaccine transport cooler vehicle		□		The Japanese vehicles are popular at site (70 to 80%) and the service network is fulfilled.

Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Schedule



3-1-2 Obligations of the Recipient Country

The obligations of Yemen in implementing this Project are shown below.

i. To provide the data and materials necessary for implementing this Project
ii. To secure the safety at Project site
iii. To pay the commissions arranged by the bank
iv. To promptly implement the unloading and the customs clearance of the equipment to be procured in Yemen and to bear the necessary expenses
v. To promptly and properly transport and store the equipment to be procured after customs clearance and bear the expenses

vi. To promptly and properly distribute and install the equipment to be procured to each facility and bear the expenses

vii. To let the related parties participate in the training by the manufacturer to be held prior to the installation and bear the expenses necessary for participation

viii. To take the tax exempt measures to the articles to be brought by the Japanese people and the parties related to the procurement of equipment and implementation of services based on the approved contract when they enter Yemen

3-2 Operation and Maintenance Plan

(1) Workshop

Maintenance of the equipment to be procured by this Project shall be in charge of the EPI headquarters, which is the lower organization of the General Health Services of Yemen as well as the implementing agency. The EPI headquarters unifies two workshops and six sub-workshops as well as procures replacement parts and manages the inventory. The engineers having received the special training are assigned to (sub-) workshops as follows and responsible for the area of the (sub-)workshop. They not only install and repair the cold chain equipment, but instruct the younger subordinates.

-Workshop

Sana'a (three engineers for cold equipment and two for vehicle), Aden (two engineers)

-Sub-workshop

Hadramawt (two engineers), Lahej (three engineers), Abyan (three engineers), Al Hodeidah (one engineer), Hajjah (one engineer), Shabwah (one engineer)

The engineers usually visit the sites and try to repair the trouble after receiving the report of trouble. If the trouble cannot be solved, they take the procedure to ask the repair to the (sub-) workshop, or if still impossible to solve, ask the repair to the central facility. Therefore, all the equipment to be procured by this Project shall be maintained in accordance with this system. The trucks to be procured by this Project shall be distributed to the workshops of Sana'a and Aden and used for the repair by visiting the site, as well as for the installation, collection, and transportation of equipment.

In the states where there is no engineer available, a staff of the workshop is dispatched when a trouble is reported.

(2) Replacement parts

To prepare replacement parts for the troubles to be anticipated in the future is effective not only for the prompt repair of the equipment but also from the standpoint of maintaining the long-term cold chain system. Therefore, these replacement parts shall be supplied in this Project also and stored under the system in which the central facility manages and supplies them as necessary. The items of this Project especially requiring the replacement parts are refrigerators (freezers) of each type. The items and the amount of replacement parts shall be determined by referencing to the past results at the EPI headquarters.

(3) Replacement period of equipment

Most of the cold chain equipment to be prepared by this Project was delivered in the late 1980s. These items are already ten years old or more are being excluded from the ones to be repaired because the procurement of these parts has been difficult and the repair costs are expensive as well as high cost-effective cannot be expected. According to an advisor of the WHO, many of the items of more than ten years old are not reliable from the standpoint of performance because of the temperature control problem. Therefore, the replacement period of refrigerators (freezer) for EPI in Yemen is considered valid to be around ten years.

(4) Maintenance costs

The government budget for the maintenance of cold chain equipment is approximately 2% of the entire EPI budget, and this rate is almost same for every year. A budget of 9.6 million riyal is expected for FY 1999.

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

(1) Verification from the conformity with upper plans

The government of Yemen declared the establishment of 169 health centers and 674 health units (with the budget of 7.5 billion riyal) to fulfill the health and medical services in the Five Year Plan of Primary National Development 1996 - 2000. These centers and units are established to fill the blank areas of health and medical service and make the access for the residents to health facilities easier and both are proceeded at present. The equipment to be procured by this Project will be distributed to the existing and new facilities, which will indirectly support the Development Plan mentioned above. Thus this Project is determined to conform to the upper level plans.

The government of Yemen is also implementing the Five Year Plan of Health Development 1996 - 2000 by focusing on the primary healthcare (PHC) as the development plan of the health and medical services at present. In this Plan, priorities are given to the mother and child health care and the measures for infectious diseases to improve the health situation which is said to be the worst in the world. The equipment to be procured by this Project will safely manage the vaccines necessary for preventing the spread of health problems and infectious diseases of mother and child and is determined to conform to the upper level plans.

The health situation of Yemen is significantly behind the world standard. Especially the mortality of infants is extremely high that the morbidity of newborn babies is about 80 among 1,000 births and that of the infants of less than five years old is 106 among 1,000 births. Main causes of death include the diseases that can be prevented by vaccination.

On the other hand, the routine vaccination rate of the infants of less than one year old, which reached 74% once, dropped to 40% in 1993, and is now floundering at about 50 to 60%. Raising the vaccination rate for the improvement of health situation of mother and child has been declared by the National EPI Master Plan 1996 - 2000, from which fact this Project conforms to the upper level plans.

(2) Verification from standpoint of EPI implementation system

The most important and yet most difficult items in implementing the EPI is said its continuity. In order to secure the health-related infrastructure and staffs as well as the supply of vaccinations and to conduct the vaccination to the infants born every day, long lasting efforts to maintain the system is indispensable.

The government of Yemen has been implementing the EPI for more than twenty years in the past and the NIDs since 1994 to prepare the cooperation system from the center to local facilities, the monitoring of activities and surveillance of diseases, and the support system for maintaining the equipment. On the other hand, the unprepared cold chain system is becoming a significant obstacle in promoting the activities. This Project to be implemented under these circumstances shall systematically prepare the equipment from the central to state facilities and from the state to peripheral facilities being continued from the supply of "Special Equipment for the Measures of Infectious Diseases in FY 1997" which was implemented before. Thus this Project is meaningful from the standpoint of maintaining and activating the system. It also promises the prompt transfer and safe management of vaccines, as well as provides the system to widely implement the EPI.

Because the preparation of system on the national level requires an enormous budget, resolution of this problem by the government of Yemen is impossible under the present situation of impeding finance. Thus this project is significantly meaningful.

(3) Verification from the standpoint of EPI facilities

Uneasy access to health facilities is considered one of the causes of floundering vaccination rate in Yemen. Especially in remote areas, there are few EPI facilities. Thus many residents are forced to go to distant facilities. According to the previously mentioned "facilities and equipment study", approximately 900 facilities accounting for about 40% of the 2,100 facilities want the preparation of new equipment because of the failure of equipment or from the desire to construct a new EPI spot. Therefore, if the requested 580 cooling items are properly distributed, they will be allocated to about 60% of these facilities, leading to drastically enlarge the areas to be covered. The number of the infants of less than one year old that need vaccination in each EPI spot varies from 100 to 1,000 depending on the area. Thus correct estimation is impossible, but this Project will increase the vaccination rate to fairly high.

(4) Verification from the standpoint of cold chain equipment

In the present Yemen, the EPI facilities all over the country own approximately 1,400 items of cooling equipment, among which 1,000, approximately 70%, were procured in the 1980s. In addition, about 740 coolers accounting for 70% of them are in trouble or not suitable for use already. Therefore, if all the 580 coolers to be procured by this Project are used as replacement, about 78% facilities will be improved.

For other equipment, approximately 100% of the accessories and vaccine transport cooler vehicle, about 85% of the vaccine carrier, about 50% of the cold box and truck will be procured against the number of presently necessary number of devices, from which it is clear that this Project significantly contributes to the preparation of cold chain system of Yemen.

(5) Verification from the standpoint of beneficiaries

The EPI is being implemented to mothers and children who are considered the most socially poor in Yemen with free of charge. The number of babies that needed vaccination by EPI in 1997 was estimated 530,000, that of the infants of less than five years was about 2.7 million, and that of the women who can be pregnant was 3.16 million. Therefore, approximately six million people, accounting for about 35% of the entire population of Yemen, are supposed to be vaccinated by the EPI. However because the actual vaccination rate is 50 to 60%, the number of the beneficiaries of EPI is supposed to be approximately 3.5 million. If the mothers and children who could not have the chance to receive vaccination in the past can have the opportunity of vaccination through this Project, the sacrifices accompanying infectious diseases will be reduced. For the people in the remote areas where the access to health facilities was not easy, the burden of transportation will be reduced.

From the standpoint of the EPI-related parties, this Project will lead to the prompt and safe transportation of vaccines and the reduction of the number of supplying times. Thus the labor and expenses accompanying the transportation can be reduced. At the facilities, safety in managing vaccines will be improved and the burden to managers accompanying the temperature control of vaccines will be reduced.

As mentioned above, implementation of this Project by the grant aid cooperation of Japan will not only lead to the improvement of medical situation for mother and children, but indirectly contribute to the families, local residents, and related staffs. Thus the effects of this Project are assumed large and significant.

4-2 Recommendation

As mentioned above, because this project especially contributes to the improvement of the health standard of mother and child, implementation of this Project is assumed very significant. However, from the smooth execution of this Project and the proper management and operation afterwards, both Yemen and Japan are expected to take the following measures.

(1) Inland transportation of the equipment

The equipment delivered at Al Hodeidah harbor shall be promptly transported to Sana'a. Transportation between Al Hodeidah and Sana'a actually takes two days. As the trucks owned by the Ministry of Public Health are fairly old, Yemen must have a detail transportation plan including the renting of trucks. Japan is also considered to take some measures to shift the delivery timing of trucks from the manufacturer.

(2) Storage of the equipment

The Ministry of Public Health has its own warehouse on the first floor of its building, a part of which is used as the central warehouse of the EPI. The central warehouse for the EPI has an area of about 800 square meter, most of which is occupied by refrigerators and related equipment. Thus the space to store new equipment is limited. The Ministry of Public Health has another warehouse of smaller scale, more than half of which is similarly used by other programs. Because it does not have any forklift or other equipment, heavy articles cannot be piled up vertically. Thus a close and detail planning is indispensable for the purpose of securing the storage place.

(3) Distribution and installation of the equipment

In the Project titled "Measures for Infectious Diseases of FY 1997", a truck owned by the EPI headquarters and the vehicles owned by states were used for the domestic distribution of the equipment. Because the vehicle owned by the EPI headquarters is old, it is considered to take several months to finish delivering all the equipment of this Project to all states by only using this vehicle. Especially, because solar refrigerator must be installed in remote areas, and they need installation work in addition, they will need two to four days for delivery and installation. Since the EPI headquarters has several engineers having the experiences of installing solar refrigerators, they must secure several vehicles to proceed the work simultaneously.

(4) Maintenance of the equipment

All the equipment supplied by the WHO and Japan and delivered from the last year to this year are CFC free refrigerators. Similar items are planned for this Project and the use of CFC free items is considered to be accelerated in the future. The EPI headquarters has assigned the trained engineers to the central and local facilities, who can maintain the traditional refrigerators using the CFC. However, because these engineers are not used to handle CFC free refrigerators, they must receive the training again at the earliest possibility.

(5) Establishment of a surveillance system

From the standpoint of keeping the activities effectively and continuously for a long period time, monitoring and surveillance are indispensable. With the cooperation of the WHO and Japan, establishment of surveillance system has just started, and a prompt organization of network and its effective functioning are desired in the future.

Member List of the Study Team

	Name	Position	Institute
1.	Mr. Tomiaki Ito	Leader	Deputy Director, First Project Study Division, Grant Aid Project Study Department, Japan International Cooperation Agency
2.	Mr. Taiji Nakatani	Equipment Planner	Planning and Survey Division, Grant Aid Management Department, Japan International Cooperation System
3.	Mr. Yasukazu Konno	Procurement Planner	Planning and Survey Division, Grant Aid Management Department, Japan International Cooperation System

Survey Schedule

No	Date		Contents		Accommodation (Number)
			Ito	Nakatani/Konno	
1	3-Oct-98	Sat	Narital0:10(KL862) → Amsterdam15:10		Amsterdam(3)
2	4-Oct-98	Sun	Amsterdam11:00(KL435) → Sana'a20:45		Sana'a(3)
3	5-Oct-98	Mon	09:30 : Courtesy Call to Embassy of Japan 11:00 : Courteey Call to Ministry of Health/ Discussion 12:00 : Courtesy Call to WHO/ Discussion 14:00 : Courtesey Call to UNICEF/ Discussion 15:40 : Discussion at WHO EPI Office		Sana'a(3)
4	6-Oct-98	Tue	07:00 : Moving to Hodeidah by car 11:20 : Discussion and Survey at Hodeidah Health Office 13:30 : Lunch Sponsored by Hodeidah Health Office 15:00 : Site Survey for the Port of Hodeidah		Hodeidah(3)
5	7-Oct-98	Wed	09:35 : Site Survey at Zabid Hospital 11:40 : Site Survey at Al-Tahrar Health Center and Workshop 12:15 : Site Survey at Store of Al-Tahrar 13:30 : Moving to Sana'a by car		Sana'a(3)
6	8-Oct-98	Thu	10:00 : Courtesy Call to Deputy Secretary of Ministry of Planning 11:30 : Site Survey at Sana'a Central Store 11:55 : Site Survey at Sana'a Workshop 12:40 : Courtesy Call to Minister of Health 13:30 : Lunch sponsored by Ministry of Health 15:00 : Data Analysis		Sana'a(3)
7	9-Oct-98	Fri	A M : Data Analysis 12:00-18:20 : Discussion on the Minute of Discussions		Sana'a(3)
8	10-Oct-98	Sat	11:00 : Signing of the Minute of Discussions 11:30 : Report to Embassy of Japan PM : Internal Meeting/ Document Work Sana'a 22:00(KL436) →		Sana'a(2)
9	11-Oct-98	Sun	→ Amsterdam 06:10 14:30(KL861) →	Survey on Agents/Supplier	Sana'a(2)
10	12-Oct-98	Mon	→ Narita08:30	Survey for Moudkhara Health Center	Sana'a(2)
11	13-Oct-98	Tue		10:00 Discussion at EPI Office	Sana'a(2)
12	14-Oct-98	Wed		10:00 Discussion at EPI Office	Sana'a(2)
13	15-Oct-98	Thu		AM : Survey of Agents PM : Report to Embassy of Japan	Sana'a(2)
14	16-Oct-98	Fri		Discussion at EPI Office Sana'a 23:10(LH653) →	Flight
15	17-Oct-98	Sat		→ Frankfurt 06:40 13:55(LH710) →	Flight
16	18-Oct-98	Sun		→ Narita 07:55	

List of Party Concerned in the Recipient Country

Oct. 5th, 1998	
(Embassy of Japan)	
Akira HOSHI	Ambassador
Toshiyuki SAKA	First Secretary
Masaaki WATANABE	Specialized Investigator
(Ministry of Public Health)	
Dr Mohamed Gharama AL-Raei	Deputy Minister of MOPH
Dr Najiba A.Abdlghani	Director General of PHC
Dr Mohammed Ali Kulais	EPI National Manager
Mr Shakib Almaqtavi	EPI Office Manager
Mr Tawfik Qaid	Director of EPI Central Work Shop
Dr Abdule Gabar Ali	Director General of Technical Cooperation
Dr Amart Alltif Yahina	Dep. Director General of Technical Cooperation
(WHO)	
Dr Yaseen Gannawi	WHO Representative
Dr Elias Durry	WHO Medical Officer - EPI
Mr Mohmmedi Mohmmed	WHO Consultant (Cold Chain)
(UNICEF)	
Dr Zein Ahmed Zein	UNICEF Health & Nutrition Officer
Dr Salah Salem Haithami	UNICEF Asst.Project Officer-Health
Oct. 6th, 1998	
(Hodeidah Health Office)	
Dr AbdulbHafiz Saleh	Director General of Health Office
Dr Mohamed Ezzi	Dep. Director General of Health Office
Dr Khaled Al-shaibani	Director of PHC depart
Mr Hakika H. Osman	Training Supervisor in UPHCP Hodeidah
Mr AbdubKorim Ehtaaiiti	Operation Officer
Dr Mohammed Ali Kulais (sana'a)	EPI National Manager
Mr Tawfik Qaid (sana'a)	Director of EPI Central Work Shop
Mr Mohmmedi Mohmmed (sana'a)	WHO Consultant (Cold Chain)

Oct. 7th, 1998

(Zabid District Hospital / Health Center)

Abdul Rlhrdiny	Supervisor (Nurs Financial Officer)
Abdula Omar	Deputy Director
Abdul Alhin	Anesthetist
Mohamd Khalcd	Healthly
Mohamd Abdula Slanin	Healthly
Mohamd Ezzy	Medical Assistant
Taher Cofish	Nurs

(Immunization Store in Hodeidah)

(Immunization Sub Workshop in Hodeidah)

Oct. 8th, 1998

(Ministry of Planning & Development)

Hisham Sharaf Abdalla	Deputy Minister, International Cooperation
Ahmed Hussein A. Jawi	General Directorate for Inernational Cooperation / General Director for Cooperation with the States of Asia, Australia

(MOPH Stores & Workshop)

(MOPH)

Dr. A. Nasher	Minister
Dr Mohamed Gharama AL-Raei	Deputy Minister of MOPH
Dr Abdulkarim Y.Rasa'e	Deputy Minister of MOPH
Dr Mohammed Ali Kulais	EPI National Manager

MINUTES OF DISCUSSIONS

THE STUDY ON THE PROJECT FOR GRANT AID FOR CHILD HEALTH IMPROVEMENT OF COLD CHAIN SYSTEM

IN

THE REPUBLIC OF YEMEN

In response to the request from the Government of the Republic of Yemen (hereinafter referred to as "Yemen"), the Government of Japan decided to conduct a Study on the Project for Grant Aid for Child Health, Improvement of Cold Chain System in Yemen (hereinafter referred to as the "Project") and entrusted the study to Japan International Cooperation Agency (JICA).

JICA sent the Study Team (hereinafter referred to as " the Team"), headed by Mr. Tomiaki ITO, First Grant Aid Project Study Division, Grant Aid Project Study Department, JICA to Yemen from October 4 to October 16, 1998.

The Team had a series of discussions with the officials concerned of the Government of Yemen and conducted a field survey.

As a result of discussions between both sides and the field survey, the Team has confirmed that it will convey the requested main items as attached for consideration by the Government of Japan.

Sana'a , October 10 , 1998

Mr. Tomiaki Ito
Team Leader,
Study Team,
JICA

Dr. Mohamed Gharama Al-Raei
Deputy Minister,
Ministry of Public Health,
The Republic of Yemen

10/10/1998

ATTACHMENT

1.Objective

The objective of the Project is to promote the activities for Expanded Programme on Immunization through the provision of necessary equipment.

2.Project Sites

The Project sites are Sana'a City and 17 Governorates.

3.Responsible and Executing Agency

Responsible Agency :Ministry of Public Health

Executing Agency :Directorate of Expanded Programme on Immunization, Ministry of Public Health

4.Items Requested by the Government of Yemen

(1)After discussions with the Team, the Government of Yemen 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 to be included in the Project will be decided after further study in Japan.

(2)The Government of Yemen assigned in Annex 1 their own Priorities on the equipment.

Note: A = 1st Priority / Essential B = 2nd Priority / Necessary
C = 3rd Priority / Desirable

5.Japan's Grant Aid System

(1)The Government of Yemen has understood the system of Japan's Grant Aid on Annex 2 as explained by the Team.

(2)The Government of Yemen will take necessary measures, as described in Annex 3 for the smooth implementation of the Project on the condition that the Grant Aid is extended to the Project by the Government of Japan.

6.Schedule of the Study

JICA will prepare a study report on the Project and send it to the Government of Yemen around January, 1999.

7.Other relevant issues

(1)The Government of Yemen will allocate the necessary budget and personnel for execution of the Project.

(2)The Government of Yemen will prepare answers to the questionnaire and submit them to the Team by October 16 , 1998.

List of Equipment

	Item	Quantity	Priority
1	Solar Refrigerator & Ice Pack Freezer (Large)	30	A
2	Gas/Electric Refrigerator	150	A
3	Ice Pack Freezer	10	B
4	Ice-lined Refrigerator (Large)	30	A
5	Ice-lined Refrigerator (Small)	200	A
6	Solar Refrigerator & Ice Pack Freezer (Small)	160	A
7	Stabilizer	200	B
8	Bimetal Thermometer	1,500	A
9	Vertical Thermometer	1,500	A
10	Cold Box	570	B
11	Vaccine Carrier	1,000	B
12	Refrigeration Car (4x4 Diesel)	2	A
13	Pick up (4x4 Extra long Wheelbase & Cab)	2	A
14	Manual Fork-lift	1	C

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 (Preliminary Study / Basic Design 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 the both Governments)
Implementation (Implementation of the Project)

(2) Firstly, an application or a request for a project made by the recipient country is examined by the Government of Japan (the Ministry of Foreign Affairs) to see whether or not it is suitable for Japan's Grand Aid. If the request is deemed suitable, the Government of Japan entrusts a study on the request to JICA (Japan International Cooperation Agency).

Secondly, JICA conducts the Study (Basic Design Study), using a Japanese consulting firm. If the background and objective of the requested project are not clear, a Preliminary Study is conducted prior to a Basic Design Study.

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.

Fourthly, the Project approved by the Cabinet becomes official when pledged by the Exchange of Notes signed by the both Governments.

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 Study (Preliminary Study/Basic Design Study) conducted on a project requested by JICA 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) to confirm background, objectives, benefits of the project and also institutional capacity of agencies concerned of the recipient country necessary for project implementation,
b) to evaluate appropriateness of the Project for the Grant Aid Scheme from a technical, social and economical point of view,
c) to confirm items agreed on by the both parties concerning a basic concept of the project,
d) to prepare a basic design of the project,
e) to estimate cost involved in the project.

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) Selecting (a) Consulting Firm(s)

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

(3) Status of a Preliminary Study in the Grant Aid Program

A Preliminary Study is conducted during the second step of a project formulation & preparation as mentioned above.

A result of the study will be utilized in Japan to decide if the Project is to be suitable for a Basic Design Study.

Based on the result of the Basic Design Study, the Government would proceed to the stage of decision making process(appraisal and approval).

It is important to notice that at the stage of Preliminary Study, no commitment is made by the Japanese side concerning the realization of the Project in the scheme of Grant Aid Program.

3. Japan's Grant Aid Scheme

(1) What is Grant Aid?

The Grant Aid Program provides a recipient country with non reimbursable funds needed to procure facilities, equipment and services for economic and social development of the country under the following principles in accordance with relevant laws and regulations of Japan. The Grant Aid is not in a form of donation or such.

(2) Exchange of Notes (E/N)

The Japan's Grant Aid is extended in accordance with the Exchange of Notes by both Governments, in which the objectives of the Project, period of execution, conditions and amount of the Grant 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 origin.

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

(5) Necessity of the "Verification"

The Government of the recipient country or its designated authority will conclude into contracts in Japanese yen with Japanese nationals. Those contracts shall be verified by the Government of Japan. 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, the recipient country is required to undertake necessary measures such as the following:

a) to secure land necessary for the sites of the project and to clear and level the land prior to commencement of the construction work,

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 facilities constructed and equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for their operation and maintenance as well as to bear all expenses other than those to be borne 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 (hereinafter referred to as "the Bank"). 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 contracts verified.

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

Necessary Measures to be taken by the Government of Yemen

Following necessary measures should be taken by the Government of Yemen on condition that the Grant Aid by the Government of Japan is extended to the Project:

1. To provide data and information necessary for the Project;
2. To bear commissions to a bank of Japan for its banking services based upon the Banking Arrangement, namely the advising commission of the "Authorization to Pay" and payment commission;
3. To ensure prompt unloading, tax exemption, customs clearance before entering in Yemen and prompt internal transportation therein of the materials and equipment for the Project purchased under the Grant Aid;
4. To exempt Japanese juridical and physical nationals engaged in the Project from customs duties, internal taxes and other fiscal levies which may be imposed in Yemen with respect to the supply of the products and services under the verified contracts;
5. 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 Yemen and stay therein for the performance of their work;
6. To provide necessary permissions, licenses and other authorizations for implementing the Project, if necessary;
7. To assign appropriate budget and staff for proper and effective use of equipment and instruments provided under the Grant Aid;
8. To maintain and use properly and effectively the equipment and instruments provided under the Project;and
9. To bear all the expenses, other than those to be borne by the Japan's Grant Aid within the scope of the Project.