

STUDY REPORT
ON
THE GRANT AID FOR CHILD WELFARE
THE PROJECT OF IMPROVEMENT OF
CHILD HEALTH
IN
THE REPUBLIC OF ANGOLA

November 2000

Japan International Cooperation Agency (JICA)

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Report of the Survey on Equipment Supply for the Grant Aid for Child Welfare
(The Project of Improvement of Child Health)
in the Republic of Angola

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Preface

In response to a request from the Government of Angola, the Government of Japan decided to conduct a basic design study on the equipment and entrusted the study to the Japan International Cooperation Agency (JICA). The JICA conducted a study of the equipment under the contract with the Japan International Cooperation System.

The JICA sent a study team of the equipment project to Angola from September 17 to October 9, 2000.

I hope that this report will contribute to the promotion of the project and to the enhancement of friendly relations between the 2 countries.

I wish to express my sincere appreciation to the officials concerned of the Government of Angola for their close cooperation extended to the teams.

November 2000

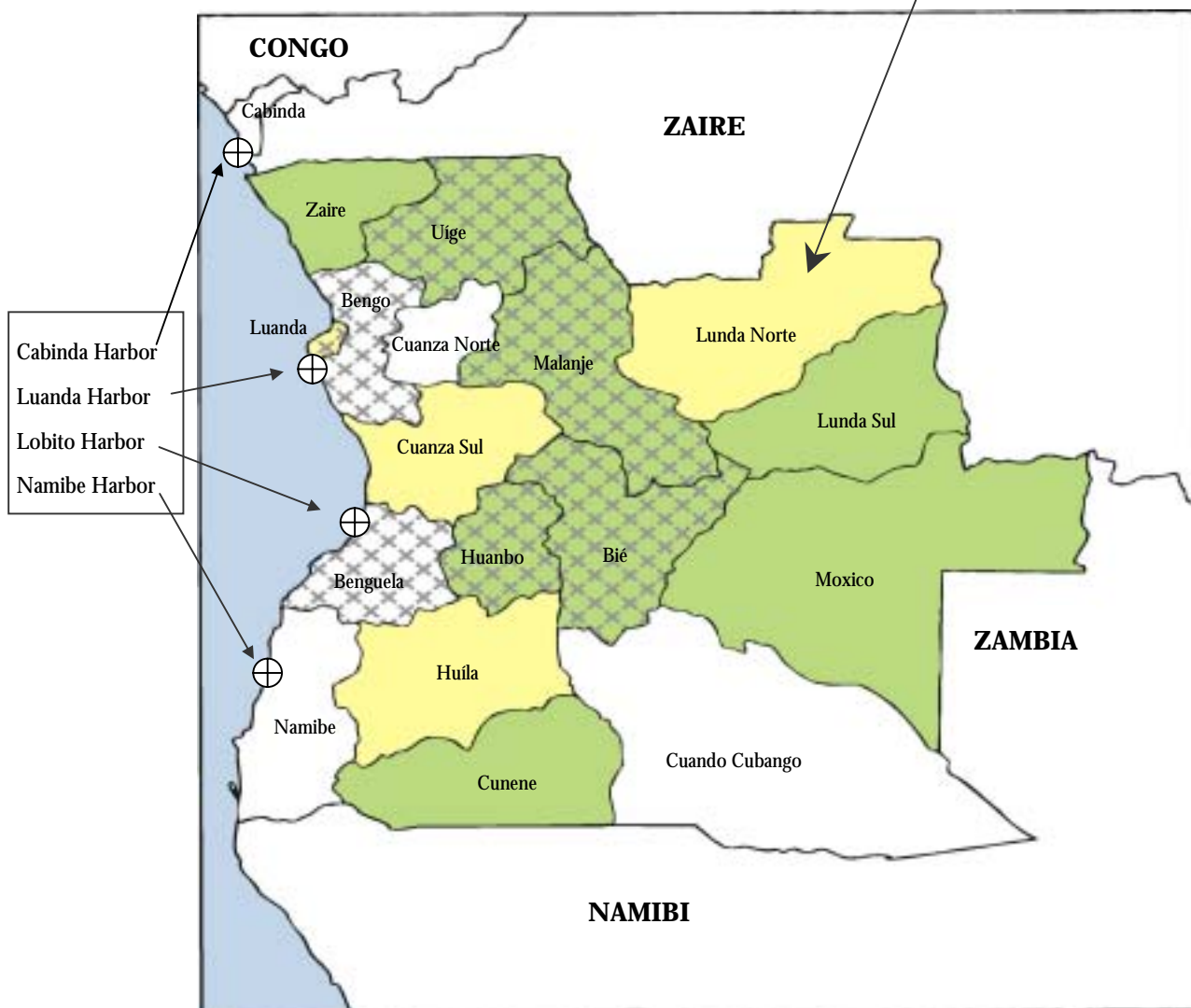
Kunihiko Saito





President

Japan International Cooperation Agency

Location map

Vaccines shall be delivered to 18 provinces of Angola.
 The mosquito nets in the Project shall be delivered to the
 Following 8 provinces : Zaire, Uige, Malange, Huanbo,
 Bie, Luanda Sul, Moxico and Cunene.



-  UNICEF : Delivered to 7 provinces from 2000 to 2001. One province is being examined at present.
-  Department of Health : Plan for 2000 covers 8 provinces.
-  Department of Health : The new candidate provinces for plan for 2003 are 4 provinces.
-  Harbor

Abbreviations

	English • Portuguese
ADPP	<i>Ajuda de Desenvolvimento de Povo para Povo</i>
AIDS	Acquired Immuno-deficiency Syndrome
AMDA	Association of Medical Doctors of Asia
BCG	Bacillus Calmette-Guerin
CIA	Central Intelligence Agency
DPT	Diphtheria-Pertussis-Tetanus Combined Vaccine
EPI <i>/ PAV</i>	Expanded Programme on Immunization <i>Programa Alargado de Vacinações</i>
GDP	Gross Domestic Product
GMP	Good Manufacturing Practice
ICC	International Component Committee
IMF	International Monetary Fund
MINSA	<i>Ministerio da Saude</i>
NGO	Non-Governmental Organization
RI	Rotary International
Sida	Swedish International Development Cooperation Agency
TT	Tetanus Toxoid
UNDP	United Nations Development Programme
OPV	Oral Polio Vaccine
NIDs	National Immunization Days
USAID	United States Agency for International Development
WHO	World Health Organization

Chapter 1 Background of the Project

1-1 Present state and problems

In the People's Republic of Angola (hereinafter to be referenced as "Angola"), the civil war having extended for a long period of time gave adverse effects to the daily living of the nation, especially to the mother and child health environment, which are clearly reflected in the health indices. As shown in Table 1-1, neonatal mortality, mortality of infants under 5 years old, and mortality of pregnant women and nursing mothers are significantly higher than those of the neighboring countries of sub-Sahara.

Table 1-1 Comparison of the health indices in the sub-Sahara countries

Country/ Indices	Neonatal mortality (out of 1,000 deliveries)	Mortality of infants under 5 years old (out of 1,000 deliveries)	Mortality of pregnant women and nursing mothers (out of 100,000 deliveries)	Average life expectancy at delivery
Angola	195*	292	1,500*	47
Swaziland	38	48	330	47
Namibia	57	74	230	51
Zimbabwe	59	89	400	44
Zambia	112	202	650	40

Source: World Child White Paper of 2000 * The Department of Health of Angola

The disease tendency of infants in Angola is, as shown in Table 1-2, that the morbidity of malaria is the highest in all age groups followed by acute diarrhea and acute respiratory diseases.

Table 1-2 Infant mortality for each disease

Order	0 to 4 years old	%	5 to 14 years old	%
1	Malaria	68.00	Malaria	49.49
2	Acute diarrhea	12.00	Acute diarrhea	23.93
3	Measles	10.55	Acute respiratory diseases	16.79
4	Acute respiratory diseases	5.98	Measles	3.60
5	Hepatic disease	1.18	Hepatic disease	3.09
6	Neonatal tetanus	1.06	Tuberculosis	1.83
7	Meningitis	0.29	Rabies	0.69
8	Rabies	0.06	Meningitis	0.44
9	Typhoid	0.05	Amebic dysentery	0.13

Source: The Department of Health of Angola, 1998

1-1-1 Malaria

In 1999, 1,276,012 cases were reported to have manifested malaria in the entire land of Angola, among which 106,644 cases were serious and 25,572 cases ended in deaths. The No.1 reason for hospitalization was and approximately 50% of the patients visiting the outpatient department had malaria and related diseases. The mortality of infants under 5 years old was high and approximately half of the causes of deaths were related to malaria. For the pregnant women and nursing mothers, malaria is a serious problem. Among the deaths of pregnant women and nursing mothers, 26% were caused by malaria. Malaria is also the causes for miscarriage, stillbirth, and delivery of neonates with low weight. Prevention of malaria infections and deaths from malaria are the subjects for suppressing the infant mortality.

1-1-2 Vaccination

The Department of Health of Angola started an Expanded Program for Immunization (EPI) from 1979. It has been developing a vaccination promotion activity with the objective to reduce the mortality and morbidity of children from diphtheria, pertussis, tetanus, tuberculosis, measles, poliomyelitis, and yellow fever. In 1996, it established a day to administer poliomyelitis vaccine to all over the country (hereinafter to be referenced as "NID" meaning National Immunization Day) in order to eradicate poliomyelitis and started to

strengthen the activity of oral administration of poliomyelitis vaccine. However, according to the WHO statistics of 1999, the ratio of the children completing the 3-time vaccination of diphtheria, tetanus, and pertussis (DTP) was 36%, which was far from that of the world average of 77%. The ratios of the children completing the oral administration of poliomyelitis vaccine for more than 3 times at the regular vaccinations were 42% in 1996, 38% in 1997, and 36% in 1998. The NIDs were implemented in 1996, 1997, 1998, and 1999, however they could not access all the areas in the country (no data is available).

Table 1-3 Transition of vaccination rates in Angola in the last 5 years (1994 to 1998)

Vaccine	1994	1995	1996	1997	1998
BCG	48%	74%	74%	68%	71%
Poliomyelitis 3	28%	42%	42%	38%	36%
DTP 3	31%	42%	42%	41%	36%
Measles	44%	65%	65%	78%	65%
Yellow fever	34%	28%	28%	53%	24%
Tetanus	10%	-	-	24%	36%

Source: The Department of Health, 2000 and WHO -: Data not available

1-1-3 Poliomyelitis

From March to May of 1999, there was a big manifestation of poliomyelitis caused by wild poliomyelitis virus (type III) which had never seen in the health and hygiene history of Africa in Luanda and its neighboring areas. The age group of patients was wide from 2 months after birth to 22 years old and 1,093 patients were confirmed, among which 788 patients, 73%, were the infants under 3 years. The main cause of the said big manifestation was pointed out to be the large number of refugees having not receiving poliomyelitis vaccination and immigrated to Luanda looking for safety. As it was clarified that the civil war obstructed the eradication of poliomyelitis, international organizations such as the United Nations Security Council temporarily arbitrated the civil war, and a nationwide vaccination campaign was planned from October to December of 1999. This plan covered the areas where no vaccination was conducted before and the Department of Health reported that approximately 3 million children were vaccinated.

1-2 Background of the Project

1-2-1 Details of the request

The Department of Health of Angola has been implementing an Expanded Program of Immunization (EPI) for measles and poliomyelitis from 1979. However the vaccination rate of children is still low. Angola aims at the eradication of poliomyelitis and suppression of the prevalence of measles by 2005. The cold chain equipment has been supported by the UNICEF since the start of the EPI. However Angola plans to improve the facilities that are not functioning because they are destroyed by the civil war of more than 20 years long, to change the equipment to the one not using Freon (chlorofluorocarbon) that destroys the ozone layer, and to increase the vaccination posts to handle the community residents that were unbalanced due to the immigration of refugees by the civil war. On the other hand, more than 1.2 million cases of malaria manifestation were reported in 1999 all over Angola, of which 100,000 were severe cases and 25,572 cases died. Approximately 50% of the outpatients were hospitalized because of malaria and related diseases and malaria was the main cause of deaths of the infants under 5 years old and pregnant women and nursing mothers.

Under these circumstances, the Project is requested to the government of Japan as the grant aid cooperation for the funds necessary for implementing the "Children's Health Improvement Plan" formulated by the Department of Health of Angola in order to improve the deteriorated health and hygienic environment to the children.

1-2-2 Contents of the Project

(1) Equipment related to malaria

The equipment necessary for the prevention, diagnosis, treatment, and survey (analysis of the effects of prevention and treatment) of malaria was requested.

- 700,000 mosquito nets and insecticide
- Malaria diagnostic drug, treatment drug, and microscope
- Motorcycle and boat for survey

(2) Equipment related to vaccination

The cold chain equipment and the equipment necessary for the prevention of infectious diseases were requested to strengthen and improve the EPI having been implemented in Angola since 1979.

- Cold chain developed in the country, provinces, districts, and health centers (refrigerator, cold room, generator, and so on)
- Vaccines to be used for the prevention of infectious diseases of infants and the women that can be pregnant (poliomyelitis, measles, and so on)
- Vehicles necessary for the immunization activities

Chapter 2 Contents of the Project

2-1 Objectives of the Project

The Department of Health of Angola aims at the reduction of the deaths of infants and pregnant women and nursing mothers from malaria as well as miscarriage, stillbirth, and birth of neonates with low weight caused by malaria. The said Department considers the malaria control plan as the subject having the highest priority. The basic malaria measure is to abolish the rainwater tanks, water pools, and gutters, which are the sources for the mosquito generation, by improving the water supply and drainage facilities. Under the present state in which the solution of water supply and drainage problems within 5 years from now is impossible, promotion of the use of mosquito nets and taking the malaria measures that can be continued are the only possible measures to achieve the goal. This grant aid project shall supply the funds for supporting the plan to reduce the morbidity and mortality from malaria.

The Department of Health of Angola has been implementing the EPI activities from 1979 in the same manner as mentioned above and aims at the eradication of poliomyelitis, extermination of neonatal tetanus, and suppression of large-scale prevalence of measles. For the early achievement of these objectives, the Department of Health of Angola puts importance on the improvement of vaccination rate all over the country and strengthening of the cold chain in the country, provinces, districts, and local health centers. This grant aid project shall be implemented to support these activities. From the above mentioned reasons, this grant aid project shall contribute to the improvement of mother and child health, especially the health of children, in Angola. It shall also contribute to the eradication declaration of poliomyelitis to be planned in 2005.

2-2 Basic concept of the Project

In order to contribute to the implementation of malaria measures in 8 provinces selected by the Department of Health of Angola and the vaccination plan all over the country of Angola, the Project shall procure the equipment related to malaria measures and the equipment related to vaccination, as well as supply the funds for providing the soft components necessary for the proper technical use of the equipment.

2-2-1 Items and amounts of procurement

(1) Equipment for malaria measures

The initial request was made by assuming that the malaria measures system of the Department of Health was established. However, that system must be structured for implementation from now on. By 2002, 3 items including 4,000 mosquito nets processed with insecticide that can be sold by one-time public relations and enlightenment activity, one motorcycle for the extension activity of mosquito nets, and one microscope for diagnosing malaria shall be procured for the 8 provinces (refer to the location map). Examination of the remaining equipment after evaluating the improvement state of the malaria plan by the Department of Health shall constitute the effective use of the equipment.

Only the 150mg tablets of chloroquine shall be planned as the treatment drug. Approximately 40% of the requested amount of the treatment drug of malaria in a year shall be procured (the amount to be procured to 8 provinces are estimated from the ratio of population). Other drugs have no clear treatment results in Angola and the requested amounts are small. Thus the Department of Health shall procure other drugs along with the remaining 60% of chloroquine.

(2) Equipment related to vaccination

1) Cold chain equipment

The existing cold chain shall be improved and strengthened by aiming at an efficient distribution system of vaccines to all over the country of Angola. One each cold room (refrigerator room and low temperature room) shall be procured for the PAV (Expanded Programme on Immunization) warehouse at the Medical Bureau of Benguela province. At present, approximately 40 million doses of various vaccines are delivered in a year to the 2 cold rooms in the PAV of the Department of Health in Luanda, the capital of Angola along the coast of northern Angola, then delivered from there to all provinces as occasion demands. The Department of Health plans to efficiently deliver approximately 20 million doses of vaccines from each cold room base by installing a new cold rooms base in South Benguela. The Project shall install voltage regulators for all the refrigerators to be procured by the project. For the 10 facilities having no generators, small generators shall be delivered. The selection concept of refrigerators and vaccine carriers are indicated below.

Table 2-1 Selection concept of refrigerators and vaccine carriers

Equipment name	Amount	Selection concept
1) Large ice-lined refrigerator	10	There are 107 ice-lined refrigerators at present, and 10 shall be added. The procured refrigerators shall be delivered so that the number of population per one refrigerator shall be as even as possible and they shall be installed in the central area, mainly the capital of each province. The vaccines delivered from Luanda shall be immediately delivered to each area via the central area of each province without being stored. The central area of each province is the area having the largest population in each province and has a refrigerator because it works as the standby storage place of vaccines of health centers and the Medical Bureau of each state also works as the vaccination base.
2) Medium ice-lined refrigerator	151	As there is no refrigerator of this size at present, 151 refrigerators shall be procured. The refrigerators shall be installed in the districts that need refrigerator among the 146 districts in the provinces (there are 4 to 12 districts in each province) and used for supplying vaccines (39 liters) to health centers and store and freeze ice packs (20 liters) for delivery purpose. However, as the Project has an objective to strengthen the vaccination bases in the district, refrigerators shall not be installed in the headquarters of the province.
3) Ice pack freezer	103	There are 25 ice pack freezers at present and 103 freezers with the capacity of 145 liters shall be supplied. One each freezer shall be installed in the districts that need them among the 146 districts in the provinces.
4) Kerosene refrigerator (24 liters)	795	One or two refrigerators shall be procured to the 5 to 7 health posts in each district. There are now 354 kerosene refrigerators all over the country at present (32 refrigerators are in trouble). Kerosene refrigerators are the main refrigerators at the health posts, but solar refrigerators are used to supplement them. As the kerosene is easy to obtain, kerosene refrigerators are suitable as the terminal cold equipment in Angola where power failure occurs frequently. The Project shall install 795 kerosene refrigerators. The population per one kerosene refrigerator after refrigerators are installed by the Project shall be 5,000 to 30,000. As the amount of vaccines used in a year in Angola is approximately 1,000 vials per 5,000 residents, each kerosene refrigerator shall play the role of cooling 1,000 to 6,000 vials of vaccines in a year.
5) Ice pack	10,300 ice packs, 258 sets	One hundred ice packs shall be delivered for each ice pack refrigerator. (The Project plans to procure 257 sets plus 20 ice packs, but as one set contains 40 ice packs, 258 sets shall be procured.)
6) Vaccine carrier (0.6 liters)	987 vaccine carriers	Vaccine carriers shall be used for vaccination by visiting. There are 555 vaccine carriers at present and 987 vaccine carriers shall be procured. There are some provinces that have no vaccine carrier at present. Vaccine carriers shall be delivered so that the population per one vaccine carrier shall be as even as possible.
7) Cold box (22 liters)	954 cold boxes	Cold boxes are stored in each district and vaccines are carried to the health posts as necessary. There are 208 cold boxes at present, and 754 cold boxes shall be additionally procured. The Project plans to store 200 cold boxes in the EPI headquarters (PAV) in Luanda all the time and use them for the transportation of vaccines to each province.

2) Vaccine

5 types of vaccines were requested for the regular vaccination in 2002 including, live poliomyelitis vaccine for oral administration (OPV) to the infants under 1 year old, DTP3 vaccine, yellow fever vaccine, BCG, and measles vaccine. The tetanus toxoid (TT) vaccine was requested for the regular vaccinations to women between the ages of 15 to 45 years old that can become pregnant. For the administration on the NIDs, measles vaccine and poliomyelitis vaccine for oral administration were requested for the infants under 5 years old. The hepatitis B vaccine requested initially shall be deleted from the Project because the vaccination policy of the Department of Health has not been established. The rabies vaccine was also requested, but deleted from the Project from the following reasons: the rabies is decreasing with the vaccination to dogs, in Angola the rabies is usually generated in January of every year and the vaccine by the Project may arrive in Angola in March, but the vaccine for treatment is required to be administered promptly. Therefore the rabies vaccine was determined to be procured by the budget of the Department of Health because it can be procured in good timing. The necessary amount of vaccines to be procured according to the vaccination schedule of Angola are shown below. Since a wild strain of poliomyelitis was discovered, the poliomyelitis for the NIDs under 5 years old shall be added with 2 doses for 3 times starting from 2000. The loss rate is assumed 30% except for 50% of BCG.

Table 2-2 Amount of vaccines to be procured

* N: Number of times to vaccinate

** Dose: Planned amount in dose

Vaccine	*N	**Dose	Reasons for estimating the amount
OPV	4/5	1,000,000	Estimated by assuming that this vaccine shall be administered 4 times to the infants under 1 year old and 5 times to infants under 5 years old. From the capacity of the warehouses, 30% of the necessary amount (23 million doses) are planned to be procured. However from the production state, the amount shall be reduced to 1 million doses.
DTP	3	700,000	Estimated by assuming that the vaccine shall be administered to the infants under 1 year old for 3 times. From the capacity of the warehouse, the amount for one-time vaccination shall be procured and the amount for the second vaccination shall be borne by the UNICEF as occasion demands.
Yellow fever	1	700,000	Estimated by assuming that the vaccine shall be administered one time to the infants under 1 year old.

TT	2	1,000,000	Estimated by assuming that the vaccine shall be administered for 2 times to the women that can be pregnant. From the capacity of the warehouse, 25% of the amount for one-time vaccination shall be procured. The remaining 75% and the one for the second vaccination shall be borne by the UNICEF.
BCG	1	1,000,000	Estimated by assuming that the vaccine shall be administered once to the infants under 1 year old.
Measles	1	1,000,000	Estimated by assuming that the vaccine shall be administered once to the infants under 1 year old and the infants under 5 years old. From the capacity of the warehouse, 20% of the necessary amount shall be procured and the remaining 80% shall be procured by the UNICEF in good timing.

* Target population: (estimated population for 2002 with the population increase rate of 3%)

Infants under 1 year old: 636,799

Infants under 5 years old: 2,961,857

Women of 15 to 45 years old that can be pregnant: 3,109,950

3) Syringe and safety box to dispose syringes

The number of syringes Angola will use in 2002 for vaccination is approximately 12.36 million by estimating from the population and the number of vaccination times, which includes 3.6 million for measles, 1.91 million for DTP, 0.63 million for yellow fever, and 6.22 million for tetanus. The Project shall procure one third of the necessary amount (4 million syringes) and the UNICEF shall procure the two thirds. The syringes to be procured by the Project shall be distributed to all over the country according to the ratio of population, that means 665 to 7,712 boxes (1 box contains 100 syringes) to each province. The autodisable syringes that cannot be re-used shall be selected. Safety box for syringes shall be planned for disposing the syringes to be procured and 40,000 safety boxes shall be procured.

4) Logistic equipment

10 vehicles of 4-wheel drive (4 WD) double cabin type with diesel engine shall be planned for addition or replacement. At present most provinces have one vehicle. One each vehicle shall be procured to 10 provinces of Bengo, Benguela, Cabinda, Huila, Kwanza Norte, Kwanza Sul, Cunene, Malange, Moxico, and Uige. The provinces to deliver the vehicles were determined by the Department of Health based on the population and the peace and order of each province and the request of each province. Thus there are still 2 provinces that cannot have any vehicle even after the Project. These 2 provinces are Luanda Sul and Zaire, both of which are depopulated areas with the population of less than 300,000 each. They have slightly more than a dozen bicycles to supplement the lack of vehicle. For the

management of the vehicle, one special engineer is assigned to each province under the responsibility of the Medical Deputy of each province who is dispatched from the headquarters of the Department of Health. The users of the vehicle are the staffs of the Department of Health in each province and the vehicles are used for immunization activities.

2-2-2 Beneficiaries

(1) Equipment related to malaria

The Department of Health plans to deliver mosquito nets to 8 provinces in 2002 which include Zaire, Uige, Malange, Huanbo, Bie, Luanda Sul, Moxico and Cunene. Other equipment shall also be delivered to 8 provinces by matching to the mosquito nets. The beneficiaries are the residents of the above mentioned 8 provinces. The facilities to be covered by the Project are the Medical Bureaus of 8 provinces.

(2) Equipment related to vaccine

The beneficiaries are the infants under 1 year old, the infants under 5 years old, and the women of 15 to 45 years old who can be pregnant in the entire country of Angola. The facilities to be covered by the Project are the hospitals under the control of the Department of Health in the entire country of Angola as well as the health centers, health posts, and Medical Bureau of each province.

2-3 Basic Design

The basic design of the Project shall be made for each of the following items by considering the procurement state of drugs and the social conditions of Angola.

2-3-1 Design Concept

(1) Equipment specifications

The UNICEF has improved the cold chain of Angola since 1991. In the Project, the equipment shall be selected mainly according to the standard specifications of the UNICEF.

The UNICEF is proceeding the standardization of equipment simultaneously with the improvement of the cold chain. Thus the UNICEF has specified 6 types of cooling equipment in accordance with the facility level and the state of the infrastructure. All of the 6 types are listed in the Product Information Sheet (PIS) as the WHO standard models. The WHO standard models have the following merits as a rule.

- They are designed for the developing countries, excel in durability and heat resistance, and are made by considering the safe management of vaccines.
- Procurement of replacement parts is fairly easy.
- Model change is rare and the inventory period of parts is longer than ordinary models.

As for the vehicles, by considering the contents of operations and the road situation in agricultural villages, the motorcycles shall be the off-road type. For the health activities by visiting with the use of vehicles, the vehicles are often used for the nutrition improvement program at the same time as vaccination. Therefore the specifications shall be a double-cabin type vehicle that can carry more than 3 passengers.

(2) Electric situation

The electric infrastructure of Angola can hardly be said to be sufficiently improved. Even in the metropolitan area, power failure occurs quite often and voltage fluctuates greatly. Since the main causes of equipment troubles are considered to be the frequent power failure and voltage fluctuation, each equipment using electricity shall have a voltage regulator. The refrigerators used at the terminal facilities of cold chain shall be the electric or the kerosene refrigerators.

(3) Suppliers

1) Vaccine

All the vaccines used for vaccination in Angola at present are procured by the UNICEF. Therefore, the vaccines procured by the Project shall satisfy the WHO standards as the prerequisite.

2) Syringe and safety box

The autodisable syringes of 0.5 ml and safety boxes shall be procured from the equipment for the EPI recommended by the WHO. As none of them are manufactured in Japan, they shall be procured from the third country.

3) Equipment related to cold chain

Cold rooms and generators shall be the Japanese products because they can be procured from Japan. Other equipment related to the cold chain shall be procured from the equipment for the EPI recommended by the WHO.

4) Vehicle and motorcycle

These items can be procured from Japan. However some Japanese companies have the manufacturing factories in overseas countries. In order to elevate the competition, the vehicles shall include those manufactured in Thailand and the motorcycles shall include those manufactured in Spain.

5) Mosquito net

In order for the residents to get rid of the trouble of treating mosquito nets with insecticide, the mosquito nets treated with insecticide and having long efficacy shall be selected. As these mosquito nets are not manufactured in Japan, they shall be procured from the third country.

6) Microscope

Microscopes can be procured from Japan. However in order to elevate the competition, those manufactured in Germany shall be included.

(4) Transportation

Except for the equipment for the new cold rooms to be constructed in the Department of Health of Benguela province, all other items shall be transported to the warehouse of Angomedica, a national pharmaceutical company located in Luanda City, by the Japanese side. The government of Angola shall prepare a warehouse in Benguela by January 2002.

(5) Training and installation

The items considered to need the training of the engineers of Angola on the installation, operation, and maintenance of the equipment are cold rooms and large generators. Installation and instruction on the initial operation by the manufacturers shall be included in the Project. Training courses on the repair of vehicles, motorcycle, and refrigerators shall be included in the soft components.

2-3-2 Basic plan

The contents of the equipment selected in accordance with the basic concept and the basic design mentioned in the previous Section are shown in Table 2-3.

Table 2-3 Contents and scales of the equipment

No.	Equipment name	Contents	Planned amount	Use
1	Freezer Room	Capacity of 60 m ³ , prefabricated, compressor, -20°C	1	Freezing and storage of vaccines
2	Cold room	Capacity of 60 m ³ , prefabricated, compressor, +7°C	1	Refrigeration and storage of vaccines
3	Ice-lined refrigerator Big size	Electric, capacity of 160 liters or more	10	Storage of vaccines
4	Ice-lined refrigerator Middle size	Electric, capacity of 36 liters or more	151	Storage of vaccines, cooling of ice packs
5	Ice pack freezer	Capacity of 140 liters or more	103	Freezing of ice packs
6	Kerosene refrigerator	Capacity of 24 liters or more	795	Storage of vaccines
7	Voltage regulator	500 W or more	1,059	Protection of refrigerator from voltage fluctuation
8	Ice pack	0.3 liters, set of 40 ice packs	258	Cooling of vaccines
9	Vaccine carrier	Capacity of 0.6 liters	987	Transportation of vaccines
10	Cold box	Capacity of 20 liters or more	954	Transportation of vaccines
11	Small generator	10 KVA	10	Power supply to refrigerators at the time of power failure
12	Big generator	60 KVA	1	Power supply to the cold room at the time of power failure
13	Syringe	Autodistract, 0.5 ml x 23 G, 100 pieces/box	40,000	Vaccination other than BCG
14	Safety box	Capacity of 5 liters, contains 100 syringes	40,000	Disposal of used syringes
15	Cone-shaped mosquito net	Cone-shaped mosquito net treated with insecticide	12,000	Protection from mosquitoes

16	Large rectangle mosquito net	Large rectangle mosquito net treated with insecticide	12,000	Protection from mosquitoes
17	Medium rectangle mosquito net	Medium rectangle mosquito net treated with insecticide	8,000	Protection from mosquitoes
18	Microscope	Binocular attached with light source and mirror, magnification of 1,000	8	Examination of malaria
19	Oral poliomyelitis vaccine	20 doses/vial	50,000	Prevention of poliomyelitis
20	DTP vaccine	20 doses/vial	35,000	Prevention of diphtheria, pertussis, and tetanus
21	Yellow fever vaccine	20 doses/vial	35,000	Prevention of yellow fever
22	Tetanus toxoid	20 doses/vial	50,000	Prevention of tetanus
23	BCG vaccine	20 doses/set, 0.05 ml/dose, for infants under 1 year old	50,000	Prevention of tuberculosis
24	Measles vaccine	10 doses/vial	100,000	Prevention of measles
25	Chloroquine	150 mg base, 250 mg phosphate, 1,000 tablets/can	6,000	Treatment of malaria
26	Pick-up truck	4 WD, double cabin, 3,000cc diesel engine	10	Transportation of vaccines, immunization activities
27	Motorcycle	50 cc, off-road type, attached with a helmet	8	Mosquito net extension activity
28	Refrigerator repair kit	R134A, attached with supplemental instrument	18	Repair and inspection of refrigerators

Table 2-4 shows the number of refrigerators and vehicles to be delivered to each province

Province name	Icelined Refrigerator, Big size	Icelined Refrigerator, Middle size	Ice pack freezer	Ice Pack	Kerosene Refrigerator	Vaccine carrier (0.6L)	Cold box(22L)	4WD vehicle	Motor cycle
BENGO	0	6	4	400	48	80	35	1	0
BENGUELA	0	9	9	900	45	8	46	1	0
BIE	0	7	6	600	54	45	45	0	1
CABINDA	1	4	4	400	24	7	25	1	0
CUNENE	1	9	5	500	30	30	35	1	1
HUANBO	0	11	5	500	45	88	50	0	1
HUILA	0	12	11	1,100	60	67	55	1	0
KUANDO KUBANGO	2	9	2	200	45	80	45	0	0
KWANZA NORTE	0	10	7	700	50	87	50	1	0
KWANZA SUL	2	12	9	900	55	118	57	1	0
LUANDA	0	9	6	600	45	0	70	0	0
LUANDA NORTE	0	9	7	700	57	74	45	0	0
LUANDA SUL	0	4	1	100	25	35	35	0	1
MALANGE	1	5	4	400	32	46	25	1	1
MOXICO	1	6	5	500	36	50	25	1	1
NAMIBE	0	5	5	500	32	35	22	0	0
UIGE	1	16	8	800	75	98	60	1	1
ZAIRE	1	8	5	500	37	39	29	0	1
PAV Head Quarter	-	-	-	-	-	-	200	0	0
TOTAL	10	151	103	10,300	795	987	954	10	8

1) Plan on the use of motorcycle

The motorcycles shall be used for visiting the villages for the extension and public relations activities of mosquito nets. The travel distance in a year is estimated as follows: 20 km (average travel distance in a day) x 200 days (working days in a year) = 4,000 km. Under the responsibilities of the Medical Deputy of each province to which the motorcycle is delivered, the malaria measure extension staff of the Department of Health shall maintain the motorcycles. The annual expenses shall be approximately 100 dollars of gas for a motorcycle (estimated from the fuel cost of 0.5 dollars/liter and the fuel efficiency of 20 km/liter.)

2) Plan on the use of vehicles

The Medical Bureau of each province shall come to the warehouse of PAV headquarters in Luanda province or the PAV warehouse in Benguela province to pick up the vaccines. The vaccines are usually transported to various medical facilities. However for the NIDs, a vaccination team consisting of 5 staffs, equipment, and vaccines shall be transported together. When the NIDs are completed, the vaccination team shall visit villages for the purpose of surveillance. The travel distances are planned as follows based on the past results.

Contents of operation	Travel distance
Vaccine pick-up from PAV warehouse	800 km x 5 times = 4,000 km
Delivery of vaccines within province	50 km x 100 days = 5,000 km
NIDs	100 km x 10 times = 1,000 km
Surveillance	100 km x 100 days = 10,000 km
Total	20,000 km

The annual expense is the fuel cost (diesel) of approximately 714 dollars/vehicle by assuming the fuel cost at 0.25 dollars/liter and the fuel efficiency at 7 km/liter. As the maintenance cost, 200 dollars/vehicle shall be needed for engine oil and gear oil. If they ask for oil change to the agent, they will be charged approximately 100 dollars/vehicle. One engineer is dispatched to the Medical Director of each province. In the Project, the said engineer shall learn the easy maintenance to improve the vehicle service technique by the soft components to be mentioned later.

2-3-3 Soft components

The Project shall supply vehicles, motorcycles, and refrigerators. In Luanda, the capital, there is an agent and its engineers shall repair the above mentioned items if the repair cost is paid. However simple repair and maintenance shall be done by the engineers of the Department of Health. In the local areas, there is no branch office or agent and it is difficult to ask the engineer of the agent to come to repair the equipment. In the grant aid project, simple starting operation shall be explained when the equipment is delivered. However, for the repair and maintenance, maintenance manuals and so on shall be attached. In the Project, soft components shall be implemented for the purpose of teaching the maintenance, easy repair, and safe driving to the engineers of the Department of Health by the engineers of the manufacturers or the agents as the lecturers.

(1) Contents of the training courses on equipment

1) Vehicle (pick-up truck, 4 WD, 3,000 cc diesel engine)

10 vehicles, training period: 10 days

The engineer of the agent shall give a training course on simple maintenance technique including the maintenance and parts replacement.

Contents: Engine oil and gear oil change necessary for each 5,000 km travel up to the travel distance of 20,000 km, air-conditioning oil change and replacement of fuel filter.

2) Motorcycle (off-road, 50 cc): 8 motorcycles, training period: 10 days

The manufacturer shall dispatch an instructor of safe driving and an engineer to the site and provide the training course on safe driving.

Contents: Wearing of helmet, confirmation of safety, driving posture, and maintenance

3) Refrigerator (electric, kerosene, refrigerator and freezer) 1,059 refrigerators, training period: 10 days

The engineer of the agent shall give the training on the initial start, maintenance, and parts replacement of refrigerators, and the training shall be conducted all over the country.

Contents: How to use the instruments for refrigerators

(2) Staff plan

A course manager, an instructor of safe driving, and a repair engineer shall be dispatched for 15 days. The service staffs of local agent shall also be used.

(3) Implementation

After concluding the contractor agreement, discussions shall be made with each manufacturer, the local agent, and the Department of Health to adjust the schedule at approximately one month after delivery of the equipment.

(4) Evaluation

Discussions shall be made with the officer of the Department of Health and the engineers whether any progress is made on the repair technique and safe driving. If necessary, discussions shall be made with the agent on the after care service to the Department of Health.

Chapter 3 Project Plan

3-1 Implementation schedule

3-1-1 Implementation schedule

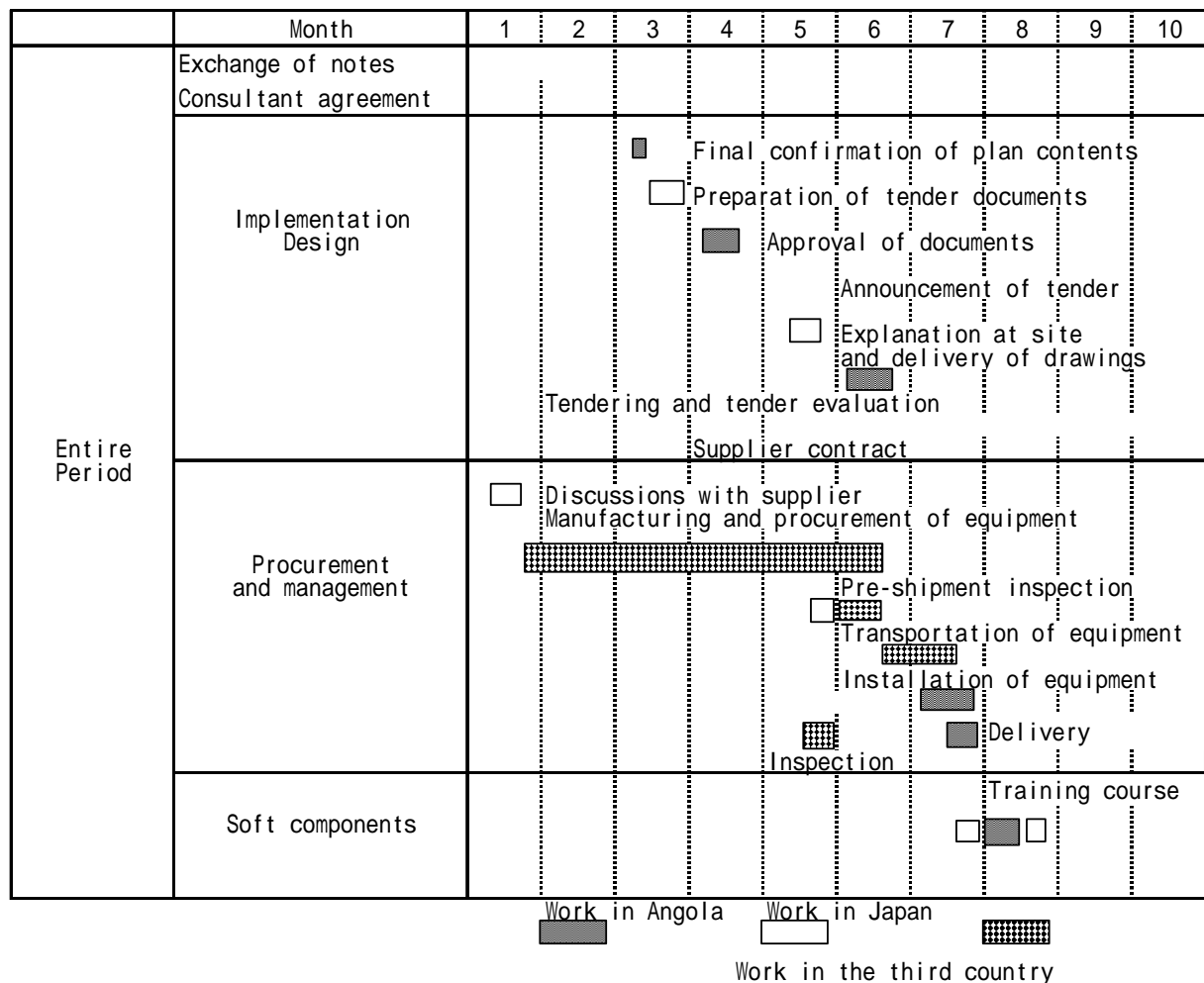
Budgetary year: Single year (FY 2000)

Entire period (from E/N to training course): 12 months

From E/N to contractor agreement: 4 months

Delivery date (from contractor agreement to delivery) : 7 month

Soft components (training course): 1 month



3-1-2 Obligations of the recipient country

The obligation of Angola for implementing the Project is the construction cost of a warehouse for the cold rooms to be constructed on the premises of the Department of Health of Benguela province. (It will cost approximately 1 million yen and a warehouse same as that in the PAV headquarters of Luanda is planned.)

Local costs for opening the training courses

Procedures on the necessary customs clearance

Domestic transportation cost

3-2 Maintenance plan

The PAV headquarters in Luanda, the capital, manages the maintenance of immunization activities throughout Angola. 16 managers are assigned under the Department Director to manage general affairs, transportation, immunological monitoring, education, training course, supervision of immunization activities at site, statistics, and logistics. The maintenance system of national level is determined by the discussions of the International Support Organization Conference consisting of the WHO, UNICEF, USAID, USAID, Rotary foundation, and the Department of Health. The Expansion Committee is held 4 times a year in March, June, September, and December, and the liaison meeting is held every Tuesday (*) chaired by the Vice Minister of Health. Especially in the liaison meetings held every week, the operating policy, strategy in vaccination, related medical problems, and logistic problems are examined in detail. The Medical Bureau of each province has one engineer who is in charge of the improvement of refrigerators and vehicles in the province, but he needs the support of the engineer of the UNICEF.

The maintenance system of malaria measures program of the Department of Health was not actually constructed when the survey was conducted in October 2000. The malaria measures shall be conducted under the leadership of the UNICEF for a while. Until 1999, even the UNICEF did not have a special staff in charge of malaria. From 2000, an Angola doctor versed in malaria measures is assigned at the UNICEF headquarters in Luanda to manage the UNICEF malaria measures throughout Angola. In Luanda, Bengo, Uige, Malange, Benguela, Huanbo, and Bie where the mosquito nets shall be delivered in 2000 and 2001, there is a UNICEF office in each province and a staff in charge of logistics is available all the time.

* On every Tuesday, the Director of Vaccination Department, that is the Director of the PAV headquarters, substitutes the chairman.

Chapter 4 Project Evaluation and Recommendations

4-1 Demonstration and verification of aptness and beneficiary effects

The diseases that threaten the children's health in Angola are malaria and various infectious diseases. The basic solution for these diseases is the improvement of the infrastructure of the entire society through the economic development. However, by considering the states of the coming 5 years, provision of preventative measures (mosquito nets and vaccines) that can expect effects is more realistic.

(1) Direct beneficial effects (Reduction of morbidity of various infectious diseases)

- 1) By distributing mosquito nets to the families and facilities having neonates, infants, and/or pregnant women and nursing mothers who have high risk to suffer malaria with high priority, the malaria infection which easily results in severe cases shall be prevented. (Reduction of the infection rate of malaria and mortality)
- 2) Use of microscope shall contribute to the early diagnosis and early treatment of malaria.
- 3) With the additional vaccination of poliomyelitis to the children under 5 years old, re-manifestation of wide strain poliomyelitis shall be prevented. (Reduction of the manifestation rate of poliomyelitis)
- 4) Re-manifestation rate of measles in the children under 5 years shall be prevented. (Reduction of the manifestation rate of measles)
- 5) Re-manifestation of yellow fever shall be prevented. (Reduction of the manifestation rate of yellow fever)
- 6) Vaccination rate shall be elevated close to that of world average and the mortality of children less than 5 years old shall be reduced.
- 7) Vaccines shall be delivered effectively with the replacement and addition of deteriorated cold chain and the bio-activation of vaccines shall be maintained.
- 8) With the construction of a new second cold room in Benguela province, the vaccines can be transported to southern provinces promptly. In addition, the vaccines can be stored all the time.

(2) Indirect beneficiary effects

- 1) Through the delivery of mosquito nets for the prevention of malaria, the recognition of the residents towards malaria shall be elevated, and the self-support efforts and participation in the society by the residents shall be further promoted.
- 2) With the reduction of the mortality and morbidity of infants from malaria, the burden for medical expenses shall be reduced.

- 3) The mortality of pregnant women by malaria shall be reduced, healthy mother nature shall be nurtured, and the average life expectancy of women (45 years old) shall be increased.
- 4) Through the malaria measures and immunization activities, the residents of the provinces and areas where the health services are not sufficiently provided because of civil war and its effects, especially the primary health care to infants, shall be promoted.

4-2 Subject

At present, the WHO and the UNICEF are promoting the vaccination plan as the joint project with the PAV headquarters of the Department of Health. Construction of a similar liaison system is urgently needed for the malaria measures. The UNICEF has assigned an officer in charge of malaria measures and has started to deliver mosquito nets from 2000. The Malaria Measures Section of the Department of Health has not participated in the above mentioned UNICEF malaria measures. However on the province level, the staffs of medical measures of province have delivered mosquito nets under the guidance of the staff of the UNICEF office. Planning, formulation, implementation, and management of the malaria measures by the Malaria Section of the Department of Health are desired at the national level.