

STUDY REPORT
ON
THE GRANT AID FOR CHILD WELFARE
THE PROJECT FOR REHABILITATION OF
HEALTH CONDITIONS IN FLOOD AFFECTED AREAS
IN
THE REPUBLIC OF MOZAMBIQUE

November 2000

Japan International Cooperation Agency

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Report of the Survey on Equipment Supply for the Grant Aid for Child Welfare
(The Project for Rehabilitation of Health Conditions in Flood Affected Areas)
in the Republic of Mozambique

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PREFACE

In response to a request from the Government of the Republic of Mozambique, the Government of Japan decided to conduct a study on the Grant Aid for Child Health, the Project for Rehabilitation of Health Conditions in Flood Affected Areas 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 Mozambique a study team July 6 to August 4, 2000.

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 Mozambique for their close cooperation extended to the team.

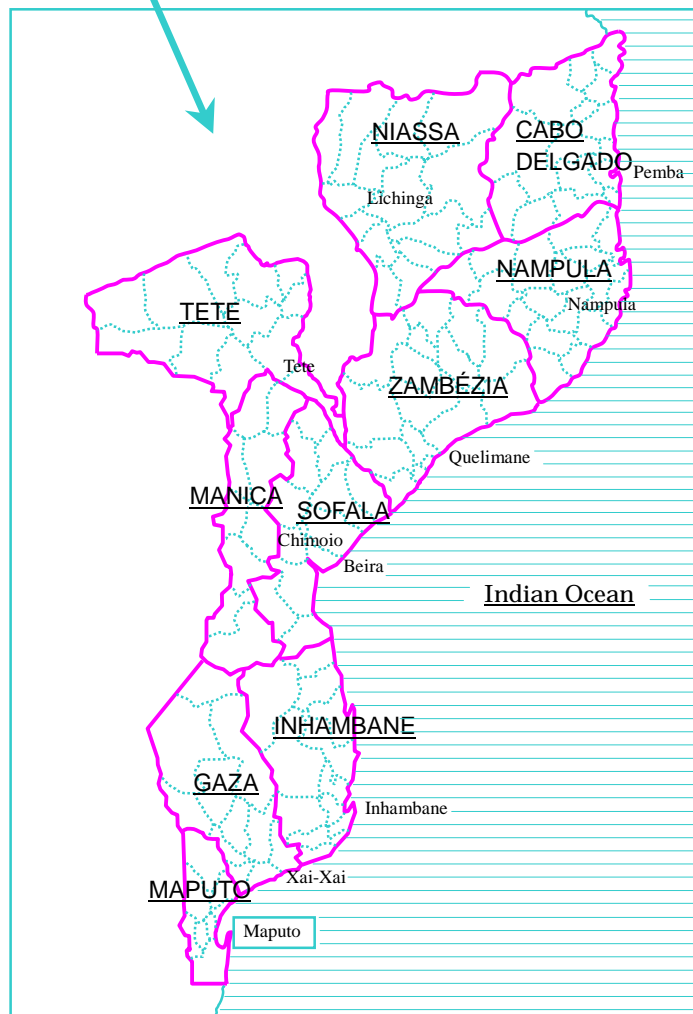
November 2000

Kunihiko Saito

President

Japan International Cooperation Agency

Location map



Mozambique

Abbreviations

BCG	Bacillus Calmette-Guerin
DPT	Diphtheria-Pertussis-Tetanus Combined Vaccine
GMP	Good Manufacturing Practice
EPI/PAV	Expanded Programme on Immunization <i>/Programa Alargado de Vacinações</i>
NGO	Non-Governmental Organization
ODA	Official Development Assistance
PHC	Primary Health Care
UN	United Nations
UNICEF	United Nations Children's Fund
WHO	World Health Organization

Chapter 1 Background of the Project

The Republic of Mozambique (hereinafter to be referenced as "Mozambique") became an independent country from Portugal in 1975. However the twenty years lasted civil war destroyed the socioeconomic infrastructure of Mozambique and made refugees. As a result, Mozambican's living environment was devastated. The health condition of Mozambique is the worst among the 40 countries south of the Sahara due to the delay of the implementation of the health development plan after the country became independent. Especially, the state of mother and child health is far from achieving one of the goals of the "Worlds Summit for Children 1990", the plan of action for implementing the world declaration on the survival, protection and development of children in the 1990s, that is "Reduction of 1990 under-five child¹ mortality rates by one third or to a level of 70 per 1,000 live births, whichever is the greater reduction by the year 2000".

The main causes of deaths of infants are malaria (18%), diarrhoeal diseases (13%), respiratory infections (8%), measles and neonatal tetanus (3%), the morbidity of which can be reduced through the fulfillment of primary health care (PHC).

The Ministry of Health started the Expanded Programme on Immunization (EPI) from 1982 with the goals to eradicate poliomyelitis, control neonatal tetanus, and reduce the morbidity of measles. It has gradually expanded the activities by reopening, improving, and increasing the vaccination posts and providing vaccination through the mobile brigade. As a results of the above mentioned activities, the vaccination coverage in the past five years has increased year after year. However the existing cold chain equipment is deteriorated as well as the number of equipment is insufficient at local facilities. Thus the replacement and improvement of equipment is urgent.

On the other hand, Mozambique suffered from the disaster, which is said the severest in the past 50 years, caused by the heavy rains from the beginning of February until March as well as cyclone "Eline" that directly hit the country at the end of February 2000. In the southern provinces around Gaza, more than 4 million people were said to have suffered from the above mentioned disaster and more than 600 deaths were confirmed up to now. Furthermore, in May 2000, cyclone "Huda" hit the coastal areas of Nampula and Zambezia provinces in the central northern area. From these disasters, many of the public facilities and buildings including roads, bridges, hospitals, and health centres were entirely or partially destroyed. In addition, some of the cold chain equipment and vehicles for mobile brigade were damaged

¹ Children of less than one year old are called infants and those less than five years old are called children under-five.

because of the flood. In the flooded areas, lack of clean drinking water and unhygienic state caused by flooded swage still continue at present. Especially, among the infants who have weak resistance, the morbidity for malaria, diarrhoea, and infectious diseases are increasing. Immediately after the disasters, the supply of drugs necessary for treatment increased by the supports of international agencies, various donors and NGOs, but there is no prospect for the future.

The government of Mozambique has been trying to restore the health sector with the supports of the World Bank and other organisations. However the total amount of damages is estimated to be equal to approximately half the amount of the annual expenditure. The complete restoration is considered to take several years. The government of Mozambique is forced to change the budget for this fiscal year. The reduction of the quality of health services throughout the country is apprehended due to the urgent austerity policy.

Under these circumstances, the government of Mozambique has formulated a plan to improve the cold chain system and to procure essential drugs for the health facilities throughout the country necessary as the measures for infectious diseases. They requested a grant aid cooperation from Japan regarding the implementation of the said plan.

Chapter 2 Contents of the Project

2-1 Objectives of the Project

The Project has the objectives to strengthen the EPI activities throughout Mozambique by replacing and supplying the deteriorated or damaged cold chain equipment at the health facilities due to the flood and contribute to the securing of national health and the reduction of morbidity and mortality by improving the health state of the children threatened with malaria, diarrhoea, and infectious diseases, which are the main diseases of infants and children.

2-2 Basic Concept of the Project

2-2-1 Basic Concept

The local downpour and the succeeding cyclones that hit Mozambique from January to March 2000 were of the scale not found recently and damaged the health sectors of Mozambique significantly. As the effects of the above mentioned damages, the activities that must be conducted incessantly, such as the vaccination and the supply of essential drugs, are forced to be interrupted or delayed. Thus the spreading of infectious diseases that could be prevented primarily or the deterioration of the health state of infants and children having weak resistance are concerned. For this reason, the government of Mozambique formulated a plan to improve the cold chain system necessary for the vaccination activity after the flooding and the measures for the infectious diseases including malaria, and requested the grant aid cooperation to the Japanese government for the implementation of the plan.

The initial request of Mozambique included 26 items: two vaccines (oral poliomyelitis vaccine and measles vaccine), 13 items related to the EPI (cold chain, syringes for vaccination, vehicles etc.), and 11 items as the measures for malaria (microscope, mosquito net, sprayer, vehicles exclusive for spraying chemicals etc.).

The request for vaccines was withdrawn from the Project, as the vaccines are properly procured by the pooling fund contributed by various international organisations. The malaria-related equipment is decided not to be covered by the Project because the activities are already proceeded by the other donors and NGOs through linking with Ministry of Health such as the distribution of mosquito nets. Instead, the essential drugs as the measures for infectious diseases including anti-malaria drug, which is requested by the Pharmaceutical Department, are determined to be included in the Project.

(1) EPI Equipment

For the implementation of the EPI, items such as vaccines, cold chain equipment, syringes, and vehicles are essential. The Programme cannot be executed if one of these items is missing.

In Mozambique, the number of refrigerators allocated to each facility of Ministry of Health is estimated 0.7 (refer to Appendix 1). However this number includes the EPI Department which has the central vaccine store, central hospitals, provincial hospitals, provincial vaccine store, district vaccine store and local health facilities. Thus the number of actually operating refrigerators at each primary level facilities is assumed to be 0.5 to 0.6. In addition to the absolute lack of refrigerator for vaccine, most of the refrigerators are deteriorated and need to be repaired or replaced. Therefore, procurement of freezers, ice-lined refrigerator/freezers, and solar refrigerators shall be planned. As the syringes for vaccination, glass syringes and reusable needles are being used at present. However these items are significantly insufficient in number and deteriorated. In addition, from the next year on, using auto-disable syringes is planned. Therefore, for the smooth implementation of the new vaccination plan, auto-disable syringes and safety boxes shall be added to the Project.

In Mozambique, 75% of people live in rural areas where houses are widely scattered. In these areas, the average distance to the nearest medical facilities is more than 20 km. Furthermore, road network and transportation means are not developed yet. As the measures for these problems, Mozambique provides the health activities in rural areas by motorcycles or vehicles (mobile brigade). Motorcycles are used for going to comparatively nearby facilities (within 20 km for one trip), and vehicles are used for going to remote areas. Ministry of Health is securing more than 10% of vaccination coverage through the use of the above mentioned activities and plans to strengthens these activities in the present Five Year Plan. Therefore, motorcycles and pick-up trucks shall be added to the plan.

(2) Essential Drugs

The essential drugs for infectious diseases shall be selected from the ones approved for use in Mozambique and generally used at the health facilities as well as effective for malaria, diarrhoea, intestinal infectious diseases, and respiratory infections by referencing to the WHO Essential Drug List. As the standard to guarantee a consistent quality, the Good Manufacturing Practice proposed by WHO (WHO-GMP)² shall be used. The manufacturers certified by the National Competent Authority to comply with the WHO-GMP shall be

² In implementing the Good Manufacturing Practice (GMP), the standard related to the manufacturing and quality control of drugs, facilities, equipment, and environment proper for each manufacturing process starting from the acceptance of raw materials must be maintained and the manufacturing control and quality control must be conducted.

determined as the suppliers. The instructions of the drugs (the package inserts) and the labels shall be written in Portuguese.

2-2-2 Beneficiaries

(1) Beneficiaries

The direct beneficiaries are the infants and children. However there are not a small number of chances that children are infected from infectious disease through the contact with the mothers and the families. Therefore, the beneficiaries shall be the entire nation from the standpoint of preventing the secondary infection to children and the further spreads of diseases.

(2) Facilities to be covered by the Project

Although the direct damage of floods is remarkable in the coastal area, the floods affected indirectly all over the country. It is important that the health care system at local level must normally function from the aspects of PHC, prevention and treatment of disease primarily. Therefore, the facilities covered by the Project shall be the existing facilities all over the country that belong to Ministry of Health including district health offices and provincial hospitals, especially the health centres that widely cover the local residents (the facilities being constructed or planned shall not be included). As the improvement of cold chain cannot cover all the facilities, improvement shall be made for the important facilities on the basis of their needs.

2-3 Basic Design

The Basic Design of the Project shall be formulated on the basis of the items shown below by considering the present state of EPI, the procurement, distribution and proper use of essential drugs, and also social conditions in Mozambique.

2-3-1 Design Concept

(1) Equipment specifications

The cold chain system of Mozambique is closely related to the state of infrastructure. Especially the selection of power source for cooling unit such as electricity, kerosene, or solar energy constitutes an important element. As the reform of the infrastructure of national level cannot be expected for a while, it is necessary to select the equipment model conforming to the present state of the area concerned.

In relation to the above mentioned, the UNICEF is proceeding the standardisation of equipment simultaneously with the improvement of cold chain and specifies the 6 models of

cooling unit in accordance with the facility level and the state of infrastructure. As the standardisation of equipment is preferable from the standpoint of maintenance, the equipment specifications shall follow the standardisation as a rule (Table 1).

Table 1 Cold chain standardisation plan by the UNICEF

Facility Item	Central storage	Provincial storage	with electricity		without electricity			
			District storage	Vaccination post	Easy to access		Difficult to access	
					District storage	Vaccination post	District storage	Vaccination post
Vaccines (refrigerated)	Cold room	Electric refrigerator	Ice-lined refrigerator	Same as left	Kerosene refrigerator		Solar refrigerator	Same as left
Vaccines (frozen)	Cold room (Freezer)	Electric freezer			Kerosene ice pack freezer			
Ice packs	Electric freezer							

Source: UNICEF (Note: means that a part of these items shall be procured by the Project.)

All these models are listed on the Product Information Sheet (PIS) as the standard model list produced by WHO. The WHO standard models generally have the following merits.

- They are designed for the developing countries, excel in durability and insulation, and are manufactured by considering the safety management of vaccines.
- Procurement of replacement parts is relatively easy.
- Model change is less frequent and they have longer stock period than the ordinary models.

As for the motorcycles and vehicles, both the activities and road conditions in remote areas shall be considered, the motorcycles shall be the off-road types. The vehicles are not only used for vaccination but also used for antenatal clinic, child health care, health education and nutrition clinic. Thus the vehicle specification shall be a double-cabin type that can accommodate more than 3 staffs as a medical team.

(2) Electricity

It is difficult to say that the electric infrastructure in Mozambique is in good condition. Even in the metropolitan area, power failure occurs frequently and the voltage fluctuates significantly. As the largest causes of troubles are considered to lie in frequent power failure and voltage fluctuation, all the equipment that uses electricity shall have the automatic voltage regulator.

(3) Maintenance

The management system of maintaining equipment is working practically in Mozambique, but the necessary parts are not smoothly available all the time. Consideration shall be paid to the prompt handling of trouble by storing the parts in the Maintenance Department.

(4) Suppliers

Among the equipment to be procured by the Project, the refrigerators and freezers for vaccines, automatic voltage regulator, and auto-disable syringes are manufactured neither locally nor in Japan because of their characteristics. Therefore, these items shall be procured from the third country. Vehicles shall be procured from Japan.

In order to guarantee the consistent quality of the drugs, the manufacturers shall comply with the WHO-GMP. The drugs listed on the WHO Essential Drug List or the Essential Drug List of Mozambique are mostly not manufactured in Japan. Though some preparations are manufactured in Japan, they do not conform to the strength or volume of those on the list. Moreover, the instructions are written in Japanese and those manufactured in Japan are extremely expensive. Therefore, procuring essential drugs from Japan is difficult. There is one small pharmaceutical manufacturer in Mozambique, but its manufacturing ability does not satisfy the requested amount. From the above-mentioned reasons, the essential drugs shall be procured from the third country mainly from Europe where the quality is reliable.

Table 2 Equipment suppliers

Planned equipment	Local	Japan	Third country	Reason for selection
Refrigerator/freezer				Those that conform to the WHO standard shall be selected. Manufactured neither in Japan nor Mozambique
Automatic voltage Regulator				Those that conform to the WHO standard shall be selected. Manufactured neither in Japan nor Mozambique
Auto-disable syringe				Those that conform to the WHO standard shall be selected. Manufactured neither in Japan nor Mozambique.
Vehicles				Can be procured from Japan. In Mozambique, the Japanese vehicles are most popular and the service network is fulfilled.
Essential Drugs				Local manufacturer's ability does not satisfy the requested amount. Language used for explanation shall conform to the one used locally. Those manufactured in Japan are extremely expensive.

(5) Transportation

Both the essential drugs and the EPI equipment shall be transported by sea. The drugs shall be transported to Medimoc warehouses in Maputo and Beira, and the EPI equipment shall be transported to the Ministry of Health's Central Warehouse in Maputo by the Japan side.

(6) Training

The only equipment that needs training of the engineers in Mozambique on the installation, operation, and maintenance is the solar refrigerator. Mozambique already has the engineers that can install the equipment. However in order to make the installation more securely, training by the manufacturers shall be included in the Project.

2-3-2 Basic Design

(1) Procurement Amount

1) Ice pack freezer

When delivering the vaccines from the central vaccine store to 11 provinces in Mozambique, an average of 100 ice packs is necessary for each province. However since the existing 3 freezers are used as the freezers of vaccines also, there is a limit for ice packs. Therefore the freezers that can be exclusively used for freezing ice packs are necessary. Two freezers as considered sufficient for the present and future EPI activities shall be procured.

2) Vaccine freezer/ice pack freezer

Each provincial vaccine store needs an average of at least 3 freezers for vaccines and ice packs for the routine EPI activities. However these stores have an average of 2 freezers at present due to deterioration. It is pointed out that the capacity of freezers will become insufficient on the occasion of vaccination campaign in the future. Therefore a total of 11 freezers shall be replaced at 8 provinces that have extremely deteriorated ones.

3) Ice-lined refrigerator with freezer

An average of 1.5 refrigerators is considered necessary for each district stores, but at present each has one refrigerator. One each refrigerator will be replaced at 14 districts where the EPI activities are extremely troubled because of deterioration.

4) Solar refrigerator

In the remote villages, it is not rare that the traffic is interrupted during the rainy season. In addition, many of these areas do not have electricity and the stable supply of vaccine, even the supply of kerosene and gas is difficult. Thus the vaccination activity must be interrupted for a long period of time. This fact is considered one of the main causes that Mozambique could not achieve the vaccination coverage of 90% and a prompt improvement is desired.

Ministry of Health plans to install solar refrigerators in the health centres that does not need electricity, gas and kerosene and that can store the vaccines for 3 to 5 months lasting quantity before the rainy season (Table 3).

Table 3 Schedule for using solar refrigerator

	Vaccine Supply	Vaccination	Temperature control	Report (district office)	Monitoring (district office)
Dry season (From April to October)	Every month	2 to 5 times/week ³	Everyday (2 times/day)	Every month	Approximately 5 times/year
Rainy season (From November to March)	1 month before rainy season	2 to 5 times/week	Everyday (2 times/day)	1 time (for six months)	

Mozambique started to introduce the solar refrigerators from 1988. Approximately 50 solar refrigerators were imported in the past and about half of them are still operating at present, but the number of solar refrigerators is not sufficient. Ministry of Health considers to introduce solar refrigerators to 49 facilities that are strongly desirable to have them installed among the areas that are difficult to have stable supply of vaccines and where the traffic is interrupted during the rainy season. These facilities strongly need solar refrigerators and are determined apt as the requested items. It is requested refrigerators to be installed at 49 facilities, but most of these facilities are newly installed so that they are not well experienced in the use and maintain of refrigerator.

Therefore, it is determined adequate from the standpoints of proper use and management that replacement of the solar refrigerators at 2 health posts that were installed in the past but had trouble in the EPI activity at present due to flooding. In addition, another solar refrigerator shall be installed to one health post that has the experience in using and maintaining different type of refrigerator but cannot conduct proper EPI activity due to the trouble of the equipment. At the same time, Ministry of Health is proceeding the standardisation of cold chain in Mozambique under the joint cooperation with UNICEF. They declared that they promote the installation of solar refrigerators and the old type absorption-type kerosene refrigerators in remote areas shall be replaced to the solar refrigerators. Thus it is considered to be adequate to include the solar refrigerator in the Project.

The roads around these health centres are not tarred yet. However, there is a fact that construction material and equipment were delivered when the health centres were constructed in the past. Furthermore, as similar equipment was installed, monitored and maintained in

³ Varies by the WHO Vaccination Manual (standard number to vaccinate for the population to be covered).

the past. Therefore, installation and succeeding monitoring shall have no trouble as vehicles should be able to access these facilities.

Table 4 Present status of the site proposed for solar refrigerator installation

Province	District	Health Facility	Level	No Electricity	Experience	Affected by Flood
CABO DELGADO	CHIÚRE	Catabua	PS		×	×
		Bilibiza	PS		×	×
		Mazeze	PS		×	×
	PALMA	Pundanhar	PS		×	×
	MUEDA	Negumane	PS		×	×
	QUISSANGA	Ntororo	PS		×	×
	MONTEPUEZ	Nairoto	PS		×	×
		NAMUNO	Mirade	PS		×
Utula	PS			×	×	
NIASSA	LAGO	Meheluco	PS		×	×
		Isangoo	PS		×	×
	CUAMBA	Titimane	PS		×	×
		Nampacalo	PS		×	×
		Mepico	PS		×	×
		Lúrio	PS		×	×
	N'GAUMA	Entepela	PS		×	×
		Chizimbir	PS		×	×
	NIPEPE	Cheachea	PS		×	×
		Sales	PS		×	×
MICANHELAS	Chiúta	PS		×	×	
NAMPULA	ERÁTI	Odinepa	PS		×	×
	MEMBA	Samora Machel	PS		×	×
ZAMBÈZIA	CHINDE	Micaune	PS		×	×
		Luabo	PS		×	×
	PEBANE	Nabuori	PS		×	×
	MORRUMBALA	Chire	PS		×	×
	LUGELA	Muabanama	PS		×	×
	INHASSUGE	Olinda	PS		×	×
	MOPEIA	Capmpo	PS		×	×
TETE	CABORA BASSA	Chípera	CS		×	×
	ZUMBO	Muze	PS		×	×
	CHIFUNDE	Nsandzo	PS		×	×
	MÁGOÈ		PS		×	×
SOFALA	CAIA	Sede	CS		×	×
	CHERINGOMA	Cheringoma	PS			×
		Maciamboza	PS		×	×
MANICA	MANICA	Púnguè	PS		×	×
		Guindingue	PS		×	×
	BÁRUÈ	Nhacatará	PS		×	×
	MACOSSA	Nhamagura	PS		×	×
MACHAZE	Mabjitanga	PS		×	×	
INHAMBANE	PANDA	DjoDjo	PS		×	×
	GOVURO	Guvuro	CS			
		Jofane	PS			
	MABOTE	Zimane	PS		×	×
	INHASSORO	Bazaruto	PS		×	×
FUNHALOURO	Mavume	PS		×	×	
GAZA	GUIJÁ	Malaze	PS		×	×
	MASSANGENA	Macue	PS		×	×

(Source: EPI Department, Ministry of Health)

5) Automatic voltage regulator

In order to cope with the power failure and voltage fluctuation, which is said the largest cause of troubles, one automatic voltage regulator shall installed at each of the electric products.

6) Auto-disable syringe

Auto-disable syringes (5ml) shall be procured in the number sufficient for the vaccination to infants (706,000), school children (1,766,000), pregnant women (883,000), and women in child bearing age⁴ (4,025,000) in a year.

The goal of vaccination coverage in Mozambique shall be 90% for diphtheria, pertussis, tetanus (DPT), 85% for measles, and tetanus for 75% of pregnant women, 50% of the women in child bearing age, and 50% of school children. The number of times to vaccinate is three for DPT, one for measles and two for tetanus. The estimation formula of the necessary amount is shown below.

《DPT》	1,906,200	=	706,000 × 3 × 0.9
《Measles》	600,100	=	706,000 × 1 × 0.85
《Tetanus》	7,115,500	=	(883,000 × 2 × 0.75)+(4,025,000 × 2 × 0.50)+(1,766,000 × 2 × 0.50)
Total	9,621,800		

7) Auto-disable syringe (for BCG)

Auto-disable syringes for BCG shall be procured in the number necessary for vaccinating the infants (706,000) in a year. The goal of vaccination coverage shall be 90% and the number of times to vaccinate shall be one. The estimation formula of necessary amount is shown below.

$$\langle \text{BCG} \rangle \quad 635,400 = 706,000 \times 1 \times 0.9$$

8) Disposable syringe (for dilution)

One disposable syringe shall be procured for each vial of vaccine (10 doses). The amount necessary for diluting the BCG and measles vaccines in a year shall be procured.

9) Safety box

One safety box shall be procured for 100 syringes. The amount necessary for incinerating the above mentioned syringes in a year shall be procured.

10) Motorcycle

Motorcycles are frequently used for delivering vaccines, drugs, and kerosene as well as for

⁴ Age of 15 to 44

the mobile brigade at villages and schools. Each of the 144 district health offices needs at least one or two motorcycles and each of the 574 vaccination posts needs at least one motorcycle. Thus a total of approximately 800 motorcycles are necessary in the entire land of Mozambique. The number of motorcycles owned in 1999 was 650. It was about 6.6% less than the previous year's 696 motorcycles.

As shown in Appendix 1, approximately 40% health facilities do not have any motorcycle. Even if they have motorcycles, most of them are in poor condition. In Nampula province, about 30% of the motorcycles are in trouble (Table 5). Since most of the roads to villages are not tarred, motorcycles are extremely deteriorated under severe operating environment.

Table 5 State of the existing vehicles in Nampula Province (162 health facilities)

	Number of motorcycles/vehicles	Number of motorcycles/vehicles in trouble	Ratio of troubled motorcycles/vehicles
Motorcycle	97	29	30%
Vehicles	70	18	26%

Expected frequency to use one motorcycle and its travel distance (partially estimated by the consultant) are shown below.

Table 6 Activities using motorcycles

Activity	Average travel distance	Frequency to use	Number of days using motorcycles in a year	Travel distance in a year
Mobile brigade	20km	2 times/week	150 days	3,000km
Delivery of vaccines	60km	1 time/month	12 days	720km
Delivery of drugs	100km	1 time/month	12 days	1,200km
School health programme	20km	2 times/month	24 days	480km
Public health programme (installation of toilet, hygiene of water source)	20km	1 time/month	12 days	240km
Mother and child health, nutrition clinic	20km	1 time/week	50 days	1,000km
Total			260 days	6,880km

The number of operating days of each motorcycle is estimated an average of 5 days in a week (260 days in a year). The number of days in which the motorcycles are not operated due to holidays and weekends is about 112. It can be considered that motorcycles are used for almost all the working days in a year. In addition, as motorcycles are used for all day long for each activity, it is not appropriate to consider that motorcycles are used for other purposes.

The staffs of the local health facilities that do not have any transportation are forced to do all

public health programme by walking or using bicycles. The amount of the work of the staffs not only impose extreme burden to them but the health services in many areas are extremely lowered because the activity range is naturally limited. In addition, the risk of quality deterioration of vaccines is large in transporting. Therefore, it is not exaggerated to say that the improvement of vaccination coverage and the securing of health of all nations are impossible without the supply of motorcycles and vehicles.

Motorcycles should be allocated to all health facilities as a rule, but there is a possibility that the maintenance of motorcycles may be difficult by the district health offices if there is such a rapid increase of motorcycles. Furthermore, by considering that the increase of burdens for maintenance costs is anticipated, the facilities to be distributed motorcycles shall be examined according to the following conditions.

The vaccination coverage of the province shall be lower than that of the entire country.

The number of the actually operating motorcycles for the population of 20,000 (average population covered by one health centre) shall be lower than two thirds of the average number of operating motorcycles in the entire country (0.5 motorcycle). (It is anticipated that the implementation of mobile brigade will be significantly affected.)

The maintenance staff shall be assigned to the provincial health office.

The maintenance budget shall be secured.

The provinces that conform to the above mentioned conditions are shown in Table 7.

Table 7 Comparison of the provinces to have motorcycles

	Cabo Delgado	Niassa	Nampula	Tete	Sofala	Gaza	Maputo	Maputo City	Average of entire country
Vaccination coverage	60.0%	86.9%	86.2%	96.6%	77.3%	97.2%	69.9%	79.5%	87.6%
Number of actually operating motorcycles for the population of 20,000	0.7	0.9	0.3	0.3	0.9	0.8	0.5	0.2	0.5
Number of maintenance staffs	3	4	3	8	1	2	5		2.4
Maintenance budget (in US\$)	121,784	12,798	181,458	148,332	280,560	89,955	81,950	79,825	-
Damages caused by flood	-	-	-	-	-	9	-	-	
Requested number of motorcycles	10	11	10	7	23	29	12	-	
Procurement			(10)			(9)			

Maintenance budget (for FY 2000): 1 US\$ = 15,540 Metical

Among the above mentioned provinces, Tete has achieved the vaccination coverage of 96.6%, Cabo Delgado, Niassa, and Sofala provinces have more number of actually operating motorcycles than the average of the entire country. Thus, these provinces shall not be included in the Project. Although Gaza does not satisfy the conditions, its 9 motorcycles are not usable due to the previous flooding, it needs replacement. As these facilities already have the experience of using motorcycles and have secured the budget for maintenance, they shall be included in the Project.

Therefore, a total of 19 motorcycles is planned to be procured including 10 to Nampula province and 9 to Gaza province.

Although Maputo City satisfies the above-mentioned conditions, it has different social environment from other provinces, and it is not appropriate to directly compare Maputo City with other provinces. Generally speaking, the reason why the vaccination coverage is lower in cities is not because the physical access to the health facilities is difficult, but because the residents miss the vaccination due to their lack of recognition of vaccination (especially people of poor level). In addition, since sanitary conditions and health facilities are not improved in some areas of Maputo, even though the population is dense, the increase of city-type infection is concerned. As the measures for these diseases, strengthening of mobile public health activity that can cover more residents with public health education is considered effective. Therefore, one vehicle proper for the mobile activity by the medical team shall be procured instead of motorcycle.

11) Double-cabin pick-up truck

Just like the case of motorcycles, vehicles are not sufficient in number as there are only 326 actually operating ones (estimate). As each section and department of Ministry of Health, 11 provincial health offices, 3 central hospitals which are in Maputo, Beira, and Nampula, 7 provincial hospitals, and 24 general hospitals (local referral hospitals covering 4 to 5 districts) have numbers of vehicles as priority, the district health offices cannot secure necessary number of vehicles. Furthermore, their vehicles are severely deteriorated due to the road conditions.

The mobile activity by the district health office usually covers 20 to 30 facilities in the area and visits each facility once in 2 to 3 months. The district health office in Nacala Port in Nampula province having relatively small diameter of 25 km in the area (population of approximately 180,000, with one general hospital, 7 health posts among which 4 have vaccination posts and 2 have troubled refrigerators) conducts vaccination at 29 facilities for 3

times a week. Therefore in this area, one vehicle is used for the mobile vaccination approximately 140 times in a year. By adding other activities shown below, one vehicle is estimated to work an average of 4.7 days in a week (partially estimated by the consultant). As the vehicles do not operate for about 112 days in a year due to holidays and weekends, they can be considered to be operated almost all the working days in a year. In addition, as the vehicles must be used for the urgent refer of patients, it is difficult for them to be used for other purposes.

Table 8 Activities using vehicles (at Nacala Port District Health Office)

Activity	Travel distance	Frequency	Number of days operated in a year	Travel distance in a year
Mobile vaccination	30km	3 times/week	140 days	4,200km
Delivery of vaccines and kerosene	200km	1 time/month	12 days	2,400km
Mobile clinic by the medical team	100km	1 time/month	50 days	5,000km
Referral of patients	30km	as necessary	30 days	900km
Delivery of drugs	200km	1 time/month	12 days	2,400km
Monitoring	120km	1 time/month	12 days	1,440km
Equipment maintenance	120km	1 time/month	12 days	1,440km
Mother and child health, Nutrition clinic, Public health programme	150km	1 time/month	12 days	1,800km
Total			280 days	19,580km

For the facilities to which these vehicles are delivered, the following conditions shall be considered from the standpoint of the aptness of request and the proper maintenance just like in the case of motorcycles.

The vaccination coverage of the province shall be lower than that of the entire country.

The number of actually operating vehicles for the population of 100,000 shall be lower than two thirds of the average number of operating vehicles in the entire country (1.9 vehicles).

The maintenance staff shall be assigned to the Provincial Health Office.

The maintenance budget shall be secured.

The provinces that conform to the above mentioned conditions are shown in Table 9.

Table 9 Comparison of provinces to have vehicles

	Cabo Delgado	Niassa	Nampula	Zambezia	Gaza	Maputo City	Average of entire country
Vaccination Coverage	60.0%	86.9%	86.2%	77.3%	97.2%	79.5%	87.6%
Number of actually operating vehicles for the population of 100,000	2.1	2.8	1.0	1.1	2.6	1.9	1.9
Number of maintenance staffs	3	4	3	Entrusted to private company	2	5	2.4
Maintenance budget (in US\$)	121,784	12,798	181,458	149,305	89,955	79,825	-
Damages caused by flood	-	-	-	-	7	-	-
Requested number of vehicles	1	1	1	-	1	1	-
Procurement			(1)	(1)	(1)	(1)	

Maintenance budget (for FY 2000): 1 US\$ = 15,540 Metical

The province that conforms to the above-mentioned conditions is Nampula province where the maintenance staffs and maintenance budget are secured. Although Gaza province does not satisfy the conditions, 7 vehicles were made inoperable due to the previous flooding and need replacement. Cabo Delgado and Niassa provinces have higher number of actually operating vehicles for the population of 100,000, these provinces shall not be covered by the Project. Procurement for Zambezia was not requested, but as Zambezia conforms to the conditions and 30% of the 50 existing vehicles (15 vehicles) are not operable due to deterioration or trouble, and even the existing operable ones are assumed to be deteriorated in near future and need replacement, one vehicle shall be procured. In addition, one vehicle shall be procured to Maputo City from the reasons mentioned above.

Therefore altogether 4 vehicles shall be procured to each of Nampula, Zambezia, and Gaza provinces and Maputo City.

12) Essential drugs

Referencing to the adjusted consumption method⁵, which is one of the calculation methods of the necessary amount recommended by the WHO, the estimated consumption amount for year 2002 is calculated by multiplying the actual drug consumption in 1999 by the annual growth rate⁶ of 3.6. The final procurement amount shall be calculated by rounding up the fractions.

⁵ A calculation method to estimate the necessary amount of drugs to cover 1,000 patients at the standard facility by examining the drug consumption from the typical types of health facilities when the drugs are supplied regularly, the inventory is controlled sufficiently and the proper prescriptions are provided by the health facilities.

⁶ Annual growth rate from 1990 to 1998 (Source: UNICEF Report 1999)

(2) Contents of the planned equipment

Table 10 shows the items which are planned in accordance with the design policy mentioned in the previous section.

Table 10 List of the planned procurement items

No.	Item	Description	Quantity	Classification
1	Icepack Freezer	Compression type, Gloss volume: approx.200 ~ 300litres	2	Central Vaccine Store
2	Vaccine and Icepack Freezer	Compression type, Gloss volume: approx.200 ~ 300litres	11	Provincial Vaccine Store
3	Icelined Refrigerator	Compression type, Gloss volume: approx.180litres	14	District Vaccine Store
4	Automatic Voltage Regulator	220V/50Hz	27	for all Electrical Equipment
5	Solar Refrigerator	with Solar panel, Battery, Stand set , Gloss volume 40 ~ 50 litres	3	Fixed Immunization Post
6	Auto-disabled Syringe	for DPT, Measles, Tetanus, 0.5ml	9,622,000	Fixed Immunization Post and Mobile Brigade
7	Auto-disabled Syringe	for BCG, 0.05ml	635,000	Fixed Immunization Post and Mobile Brigade
8	Disposable Syringe	for Dilution, 5ml	124,000	Fixed Immunization Post and Mobile Brigade
9	Safety Box	for 100 Syringes	104,000	Fixed Immunization Post and Mobile Brigade
10	Motorbike	Off Road type	19	Fixed Immunization Post
11	4WD Pick-up Truck	4WD, Diesel engine, Right-hand steering, Air-conditioner	4	Provincial/District Health Office
12	Salbutamol Tablet	4mg Tablet	7,500,000	Asthma, Bronchitis (Oral)
13	Salbutamol Solution for Nebulizer	5mg/ml 20ml	22,300	Asthma, Bronchitis (for Nebulizer)
14	Paracetamol Tablet	500mg Tablet	35,000,000	Analgesics, Malaria
15	Paracetamol Syrup	120-160mg/5ml 100ml	55,700	Analgesics, Malaria
16	Pheoxymethylpenicillin Tablet	500mg Tablet	9,700,000	Bronchitis, Other Infective Diseases
17	Benzylpenicillin Benzathine	2.4 Million IU vial	252,000	Syphilis
18	Amoxycillin Capsule	500mg Capsule	11,800,000	Pneumonia, Bronchitis, Other Infective Diseases
19	Erythromycin Tablet	500mg Tablet	10,600,000	Mycoplasma Pneumonia, Chlamydia Infection
20	Doxycycline Tablet	100mg Capsule	2,200,000	Exacerbation of Infection, Gonorrhoea, Cholera
21	Chloramphenicol Capsule	250mg Capsule	6,000,000	Meningitis, Typhoid, Severe Infective Diseases
22	Chloramphenicol Injection	1g vial	215,000	Meningitis, Typhoid, Severe Infective Diseases
23	Co-trimoxazole Tablet	480mg Tablet	14,500,000	Pneumonia, Bacillary Dysentery, Urinary Tract Infection
24	Co-trimoxazole Suspension	240mg/5ml 100ml	22,300	Pneumonia, Bacillary Dysentery, Urinary Tract Infection
25	Metronidazole Tablet	250mg Tablet	11,200,000	Amoebic Dysentery, Trichomoniasis, Giardia Lamblia, Pseudomembranous
26	Mebendazole Tablet	100mg Tablet	8,700,000	Anthelmintics
27	Quinine Injection	600mg/2ml Ampoule	399,000	Severe Malaria, Cerebral Malaria
28	Sulfadoxine/Pyrimethamine	525mg Tablet	1,800,000	Malaria
29	Glucose 5% Intravenous Infusion	5% 1000ml	212,000	Intravenous Solution
30	Oral Rehydration Salt	27.9g Sodium Chloride 3.5g Sodium Citrate 2.9g Potassium Chloride 1.5g Glucose 20.0g Granule or Powder in Sachet	1,737,000	Replace Fluid and Electrolyte Loss in Diarrhea, Maintain Optimal Hydration
31	Chlorpheniramine Maleate Tablet	4mg Tablet	5,700,000	Allergy, Anaphylaxis
32	Tetracycline Hydrochloride Eye Ointment	1% tube	55,700	Ophthalmia Neonatorum, Conjunctivitis, Hordeol
33	Cetrimide and Chlorhexidine Solution	Cetrimide 15% Chlorhexidine 1.5% 100ml	7,600	Skin Disinfection

The number of facilities to be covered by the Project and the estimated number of equipment to be delivered are shown in Table 11.

Table 11 Equipment delivery plan for each province

Region	Province	Number of districts	Freezer for vaccines and ice packs		Ice-lined refrigerator		Solar refrigerator		Motorcycle		Pick-up truck	
			Provincial store		District (local) store		Vaccination post		Vaccination post and other		Provincial Health Office	
			Facility	Number to be delivered	Facility	Number to be delivered	Facility	Number to be delivered	Facility	Number to be delivered	Facility	Number to be delivered
Northern region	Cabo Delgado	17	1	(1)	2	(2)	10		6		1	
	Niassa	16	2	(2)	1	(1)	11		17		1	
	Nampula	20			2	(2)	2		10	(10)	1	(1)
Central region	Zambezia	17			3	(3)	7		28		1	(1)
	Tete	13	1	(1)	1	(1)	3		7			
	Manica	10	1	(1)	1	(1)	5		6			
	Sofala	13	2	(2)	1	(1)	3	(1)	23			
Southern region	Inhanbane	14	1	(1)	2	(2)	6	(2)	17			
	Gaza	12	2	(2)	1	(1)	2		29	(9)	1	(1)
	Maputo	9	1	(1)					12			
	Maputo City	3									1	(1)
	Total	144	11	(11)	14	(14)	49	(3)	155	(19)	6	(4)

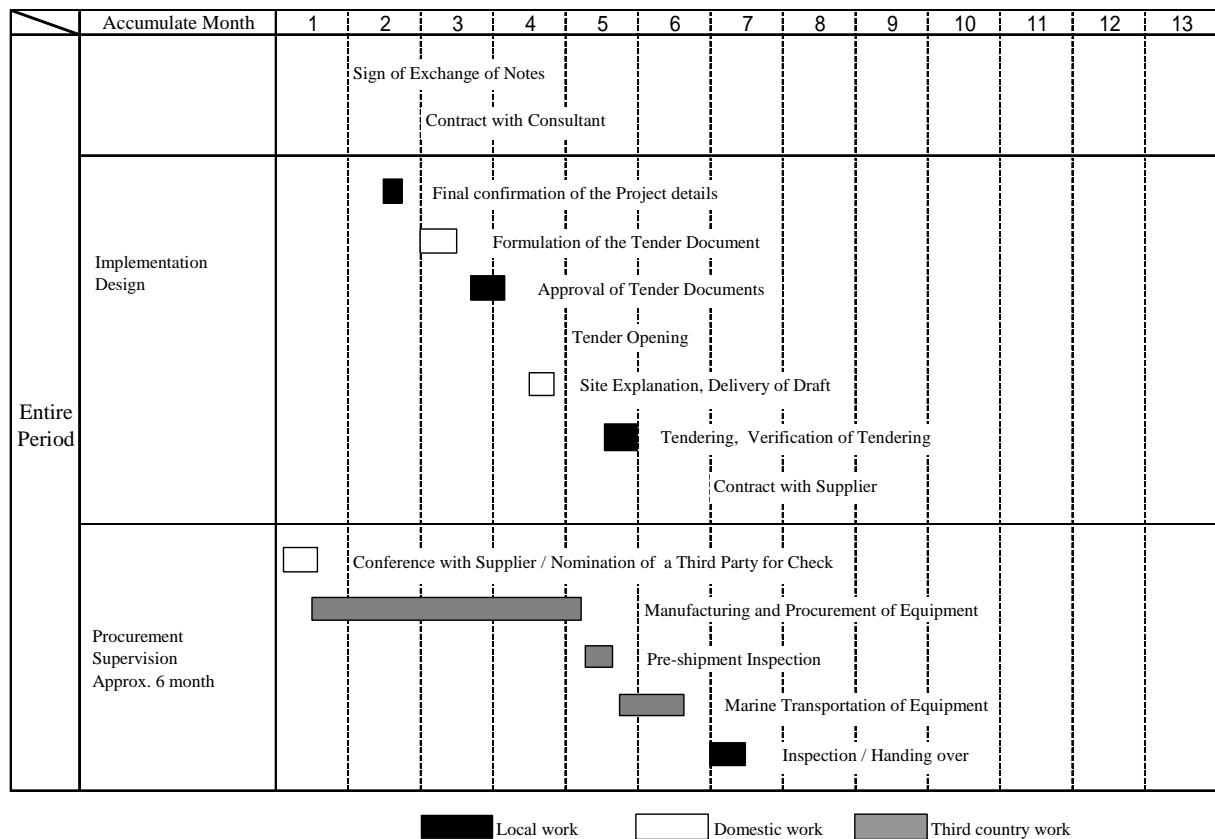
Chapter 3 Implementation Plan

3-1 Implementation Plan

3-1-1 Implementation Schedule

The work Implementation Schedule has been prepared in accordance with the Japan's grant aid scheme as shown below.

Table 12 Implementation schedule



3-1-2 Obligations of Recipient Country

The obligations of Mozambique for implementing this Project are as follows.

(1) Obligations common to the grant aid project

- 1) To secure the land necessary for the sites of the project prior to the installation work.
- 2) 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.

- 3) 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.
- 4) 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.
- 5) Proper Use
The recipient country is required to maintain and use the equipment purchased under the Grant Aid properly and effectively and to assign staff necessary for the operation and maintenance as well as to bear all expenses other than those covered by the Grant Aid.
- 6) Banking Arrangement (B/A)
 - a) The Government of the recipient country or its designated authority shall open an account in the name of the Government of the recipient country in a bank in Japan. The Government of Japan will execute the Grant Aid by making payments in Japanese yen to cover the obligations incurred by Government of the recipient country or its designated authority under the Verified Contracts.
 - b) The payments will be made when payment requests are presented by the bank to the Government of Japan under an Authorization to Pay issued by the Government of the recipient country or its designated authority.

3-2 Operation and Maintenance plan

(1) Maintenance of the equipment

The medical equipment in Mozambique, including refrigerators and vehicles is comprehensively maintained by the Maintenance Department of Ministry of Health. This department maintains the facility equipment as well as supervises the provincial maintenance section, trains engineers, procures and maintains the parts. Especially it puts efforts in the training of engineers. In 1999, it provided training for solar system to 24 engineers of all provinces for a period of one week. In addition, it has started to formulate a list of assets of the equipment related to Ministry of Health all over the country on the basis of the maintenance information system constructed under the supports of Italy. In the future,

maintenance is expected to be simplified and conducted promptly.

In the local areas, each province has the maintenance section. This section maintains the facility equipment at the medical and health facilities in the province.

(2) Stock management and inventory of drugs

The quality of the essential drugs to be procured by the Project can be kept at the room temperature of 1 to 30 °C. Medimoc warehouses in Maputo are temperature controlled by shading light and air-conditioning as well as it is in orderly manner with the use of forklifts. The warehouse No.8 is being expanded to conform to the increase of the drug demand in the future. After the completion of the said expansion work, a space of 574 m² will be secured. A computer system is introduced for the stock management and collecting the information of each province. Although the provincial warehouses and health facilities do not have the computerized management system, they have thoroughgoing store management system with the use of tally sheets and delivery/acceptance cards. The store room of health centres are also properly maintained to prevent robbery by installing iron grids or secure lock system. In addition, consideration is paid to the shading and ventilation for the quality maintenance in these warehouses.

(3) Distribution of drugs

Ministry of Health has its own distribution and quality control system for drugs, which effectively functions. The procurement plan for each quarter is formulated and tender was conducted by the Pharmaceutical Department. The succeeding importation procedure and delivery to provincial warehouses shall be entrusted to Medimoc. After clearing the customs in Maputo and Beira, the drugs shall be delivered to the drug warehouse of Medimoc once, then go through the quality control by submitting a samples for each lot to the Central Laboratory of Ministry of Health. The analysis and tests shall be done on the basis of the pharmacopoeia on which each preparation is based. In order to confirm the constant quality of pharmaceutical preparations, solid preparations shall undergo weight test, content uniformity test, stability test, disintegration test, and dissolution test, and the parenteral solutions shall undergo weight test, osmotic pressure, pH, sterility test, and pyrogen test.

Delivery of drugs to each province is planned for every 3 months as a rule. However, emergency ordering is also accepted. Delivery from the provincial warehouse to the health facilities is conducted every month on the basis of the request.

Vaccines are tendered and purchased by the Pharmaceutical Department, then stored and delivered by the EPI Department. The delivery route of vaccines is different from that of

drugs. Vaccines are delivered from the central vaccine store to provincial store every 3 months, from the provincial store to district store every one to three months generally, and from the district store to vaccination posts every month. The vaccines are delivered by airplane, vehicle, bus, motorcycle, or walking depending on the level.

Chapter 4 Project Evaluation and Recommendation

4-1 Project Effect

The government of Mozambique declares that the reduction of morbidity and mortality in the groups with large risks such as infants, children under-five, and mothers as the subject of priority in the health development. In responding to this declaration, Ministry of Health positions the EPI activity and the measures for infectious diseases as one of the important programmes. Ministry of Health is putting efforts in improving the cold chain system, strengthening the mobile EPI activity, and establishing the constant drug supply system by aiming at the improvement of vaccination coverage and controlling of infectious diseases. However, it is concerned that due to lack of funds and the effects of previous damage of flooding its implementation is to be stagnant or recessed.

Under these circumstances, implementation of the Project is significant. If the supplied equipment is effectively used, the following direct and indirect effects can be expected.

(1) Freezer, refrigerator/freezer

An average of one freezer shall be increased for each provincial vaccine store, which will make the supply of ice packs or vaccine stock management easy. At the district vaccine store, the management problem of vaccines shall be improved at about 10% of facilities with the replacement of refrigerator. Thus, the wastage shall be reduced as well as cases of cancellation of vaccination due to the troubled refrigerator shall be reduced. At the vaccination posts, vaccination shall become possible all the time at 3 districts with the installation of solar refrigerators.

(2) Syringe and others

In Mozambique, new policy of using auto-disable syringe is being introduced from the safety standpoint. When the Project is implemented, the risk of infection related with the vaccination shall be reduced. It will benefit the people that need vaccination that account for approximately half of the entire nation⁷. By disposing syringes safely with the use of safety box, environmental risk shall be also reduced.

(3) Motorcycle and Vehicle

With the deployment of motorcycles and vehicles, vaccine transportation, mobile brigade, and supervision of EPI activities to the residents living in remote areas where no health facility

⁷ Approximately 700,000 infants, 900,000 pregnant women and nursing mothers, 23 million children of one to under 5 years old, 4 million women in child bearing age, and 1.8 million school children.

exists shall be strengthened. Improvement is especially expected in Nampula and Zambezia provinces where the vaccination coverage is lower than the average of Mozambique.

Improvement of the nation wide cold chain and implementation of effective EPI activity mentioned above shall not only constitute the foundation for achieving the complete vaccination coverage of 90%, which the government of Mozambique declare as its goal, but shall be expected to have the effects such as to increase the reliability of residents towards health facilities and promote the resident participation to public health activities.

(4) Essential drugs

The basically poor living environment was further deteriorated by the attack of the cyclone and the flood. The lives of infants and the children under-five were threatened because of the deteriorated living environment and of the increase of infectious disease caused by the flood. They can be treated properly with the essential drugs having guaranteed quality. This fact is expected to enable the early treatment of patients. As a result the infection sources and the transmission of infectious disease shall be exterminated and the spreading of diseases can be prevented. By securing the necessary amount of essential drugs, the budget appropriated for the essential drugs can be allocated to higher-level drugs, which will lead to the proper treatment.

The beneficiaries of the Project are the wide ranges of nations of Mozambique. In implementing the Project, the Japanese side shall procure the equipment and drugs. After the equipment and drugs are delivered to Mozambique, they shall be delivered to the facilities through the existing delivery system and provided to the residents. As they do not have environmental effect, the Project is considered to be adequate to be implemented by grant aid cooperation.

4-2 Recommendation

As mentioned above, the Project is expected not only to have enormous effects on the health of the children of Mozambique, but contribute to the improvement of health condition of the entire nation of Mozambique. Therefore, implementation of the Project under the grant aid cooperation is considered adequate. However, from the standpoint of smooth implementation and proper maintenance and operation of the equipment, the following measures are required to Mozambique.

(1) Supply of vaccines and syringes

There are two main operations of procurement and delivery of vaccines and syringes. For

example, the vaccines are procured by the Pharmaceutical Department, customs clearance by the Medimoc, stored and delivered by the EPI Section. Whereas procurement of syringes is done by the Procurement and Transportation Department, and stored and delivered by the Central Warehouse of Ministry of Health. For this reason, if the mutual information exchange is missing, necessary amount of goods would not be delivered to the health facilities at the same time.

In order to avoid this kind of trouble, the responsible central offices shall have close linkage among themselves so that vaccines and syringes could be delivered to the peripheral facilities in right time with right quantity.

(2) Staff training

Although auto-disable syringes have been started to be introduced in some areas of Mozambique, reusable syringes are generally used for vaccination. For this reason, some staffs are not accustomed to using and disposing the auto-disable syringes. At the central level, training has started already. However because these syringes are used at the peripheral vaccination posts, it is necessary to thoroughly instruct the staffs on how to use auto-disable syringes.

(3) Maintenance of refrigerator

From the standpoint of environmental protection, it is planned to procure the refrigerators with chlorofluorocarbon (CFC)-free refrigerant under the Project. In Mozambique, the use of CFC-free refrigerant is considered to be accelerated. The Ministry of Health has assigned sufficiently experienced engineers to each province so there is no problem maintaining the refrigerator using Fleon gas. As a little different system is used for the CFC-free refrigerators, they should start to train the staffs systematically as early as possible.

(4) Monitoring

The cold chain equipment and the essential drugs to be procured by the Project have the absolute conditions that they should be securely delivered to the peripheral facilities with the right amount and used properly. Especially, it is important for the smooth distribution of essential drugs to promptly feed back the ordering results, the demand and the consumption result at the health centres to the governing agency such as provincial warehouse, Medimoc, or the Pharmaceutical Department for the information analysis. With regard to the collection and analysis of information, computerisation has been proceeded. However because Mozambique is still in the transition period at present, it is important that computerisation is securely implemented without any confusion in the future.

Province	Cabo Delgado	Niassa	Nampula	Zambezia	Tete	Manica	Sofala	Inhambane	Gaza	Maputo	Maputo City	Other	Total
National Data													
Population (estimated)	1,436,496	848,889	3,196,472	3,240,576	1,287,517	1,103,857	1,424,378	1,222,219	1,173,337	899,329	1,007,584		16,840,654
Area, km2	77,867	122,176	78,197	103,127	100,724	61,661	67,218	68,615	75,549	23,276	300		778,710
District	17	16	20	17	13	10	13	14	12	9	3		144
Health facilities(1999)													
Health facilities	65	112	162	160	84	74	139	73	88	65	27		1,049
Ratio of the facilities without vaccination post	40.0%	61.6%	53.7%	46.3%	36.9%	23.0%	58.3%	21.9%	48.9%	41.5%	14.8%		45.3%
Motorcycle													
Existing(1999)	67	53	75	99	30	62	93	53	64	35	16	3	650
in good condition (estimated)	47	37	53	69	21	43	65	37	45	25	11	2	455
per health facility	0.7	0.3	0.3	0.4	0.3	0.6	0.5	0.5	0.5	0.4	0.4		0.6
per resident 20,000	0.7	0.9	0.3	0.4	0.3	0.8	0.9	0.6	0.8	0.5	0.2		0.5
Vehicle													
Existing(1999)	43	34	47	50	41	29	72	35	43	22	28	22	466
in good condition (estimated)	30	24	33	35	29	20	50	25	30	15	20	15	326
per health facility	0.5	0.2	0.2	0.2	0.3	0.3	0.4	0.3	0.3	0.2	0.7		0.3
per resident 100,000	2.1	2.8	1.0	1.1	2.2	1.8	3.5	2.0	2.6	1.7	1.9		1.9
Refrigerator													
Existing(1999)	78	63	104	119	83	113	84	84	77	33	36	1	875
in good condition (estimated)	62	50	83	95	66	90	67	67	62	26	29		700
per health facility	1.0	0.5	0.5	0.6	0.8	1.2	0.5	0.9	0.7	0.4	1.1		0.7
Coverage in practical (estimated), WHO													
Coverage in practical	60.0%	86.9%	86.2%	97.9%	96.6%	93.3%	77.3%	95.9%	97.2%	69.9%	79.5%		87.6%

Source: EPI Department, Ministry of Health and WHC

1. Mr. MORIMOTO Yasuhiro Leader
Deputy Director, Second Project Management Division,
Grant Aid Management Department
Japan International Cooperation Agency

2. Mr. NAKATANI Taiji Equipment Planner
Japan International Cooperation System

3. Mr. KODAMA Tetsuo Procurement Planner
Japan International Cooperation System

4. Ms. WADA Eiko Interpreter
Japan International Cooperation Centre

Date		Survey schedule	Place
Jul.6 (Thu)		Depart Tokyo	
Jul.7 (Fri)	AM:	Singapore Johannesburg Pretoria Honorary visit to JICA, South Africa Honorary visit to the Embassy of Japan, South Africa	JICA Embassy of Japan
	PM:	Meeting	JICA
Jul.8 (Sat)	AM:	Pretoria Johannesburg Maputo	
	PM:	Internal Meeting	
Jul.9 (Sun)		Internal Meeting	
Jul.10 (Mon)	AM:	Honorary visit to the Embassy of Japan, Mozambique Meeting with Ministry of Health representatives	Embassy of Japan Ministry of Health
	PM:	Honorary visit to the Ministry of Foreign Affairs and Cooperation Visit and interview with EPI Department	Ministry of Foreign Affairs and Cooperation Maputo Central Hospital
Jul.11 (Tue)	AM:	Meeting with EPI Department Visit and interview with Pharmaceutical Department	Maputo Central Hospital Pharmaceutical Dept.
	PM:	Meeting with Manager National Malaria Control Programme Visit and exchange opinions with UNICEF	Ministry of Health UNICEF
Jul.12 (Wed)	AM:	Meeting with EPI Department	Maputo Central Hospital
	PM:	Arrangement of the Minutes of discussion	Ministry of Health
Jul.13 (Thu)	AM:	Signing of the Minutes Meeting with International Cooperation Division	Hotel Tivoli
	PM:	Arrangement of Site Survey Interim Report for the Embassy of Japan	Ministry of Health Embassy of Japan
Jul.14 (Fri)	AM:	Visit and exchange opinion with USAID Visit and interview with Maintenance Department	Ministry of Health Maintenance Dept.
	PM:	Discussion on the questionnaire	International Cooperation Div.
Jul.15 (Sat)		Internal Meeting	Ministry of Health
Jul.16 (Sun)	AM:	Maputo Nampula	
Jul.17 (Mon) 【Site Survey】	AM:	Honorary visit to Provincial Health Office District Vaccine Store, Nampula	Nampula City
	PM:	Provincial Medical Stores, Nampula Maintenance Section, Nampula Province	
Jul.18 (Tue) 【Site Survey】	AM:	Carapira Health Centre District Health Office, Nacala Port	Monapo District Nacala City
	PM:	Nacala General Hospital, Nacala Port Teterane Health Post	Meconta District
Jul.19 (Wen) 【Site Survey】	AM:	Namutequelua Health Post 25 Setembro Health Center	Nampula City
	PM:	Nampula Maputo	
Jul.20 (Thu)	AM:	Discussion on specifications (EPI)	Maputo Central Hospital
	PM:	Central Warehouse (Equipment), Ministry of Health	Maputo City
Jul.21 (Fri)	AM:	Visit and interview with medimoc (Medical and Pharmaceutical Agency of Mozambique)	medimoc Headquarters
	PM:	Meeting with the National Malaria Control Programme Discussion on specifications (EPI)	Ministry of Health Ministry of Health
Jul.22 (Sat)		Meeting	
Jul.23 (Sun)		Meeting	
Jul.24 (Mon) 【Site Survey】	AM:	Visit Maniça Institute of Public Health, Maniça Hospital Survey of flood affected area	Maniça Town, Maputo Province
	PM:	Visit Xinavane Rural Hospital Survey of flood affected area Market research, vehicles	Xinavane Town, Maputo Province Maputo City
Jul.25 (Tue)	AM:	Survey of statistics (health sector)	Health Information Dept.
	PM:	Medimoc warehouse No.9 Report to the National Director of Planning and Cooperation	Maputo Central Hospital Ministry of Health
Jul.26 (Wed)	AM:	Discussion on specifications (Pharmaceutical dept.) Discussion on specifications (EPI)	Pharmaceutical Dept. Maputo Central Hospital
	PM:	Visit and interview with Central Laboratory Survey of statistics (health sector)	Ministry of Health Health Information Dept.

Date		Survey schedule	Place
Jul.27 (Thu)	AM:	medimoc warehouse No.8 Discussion on specifications (EPI)	Maputo City Maputo Central Hospital
	PM:	Discussion on specifications (Pharmaceutical dept.)	Pharmaceutical Dept.
Jul.28 (Fri)	AM:	Survey of local pharmaceutical manufacturer (Petropharm)	Maputo City
	PM:	Report to the Embassy of Japan, Mozambique	Embassy of Japan
Jul.29 (Sat)	AM:	Market research, pharmaceuticals	Maputo City
Jul.30 (Sun)	PM:	Maputo Johannesburg Pretoria	
Jul.31 (Mon) 【Market research】	AM:	Survey of local medical equipment manufacturer	Pretoria
	PM:	Survey of local pharmaceutical manufacturer	Pretoria
Aug.1 (Tue)	AM:	Market research, pharmaceuticals	Pretoria
	PM:	Survey of local medical equipment manufacturer	Johannesburg
Aug.2 (Wed)	AM:	Survey of local pharmaceutical manufacturer	Pretoria
	PM:	Report to JICA	JICA
Aug.3 (Thu)	AM:	Report to the Embassy of Japan, South Africa	Embassy of Japan
	PM:	Pretoria Johannesburg	
Aug.4 (Fri)	PM:	Singapore(transit) Tokyo	

The List of Parties Concerned in the Recipient Country

1. Embassy of Japan (Mozambique)

Name	Position
Mr. Nagashima Kohei	Ambassador

2. Embassy of Japan (South Africa)

Name	Position
Mr. Ishizuka Hayato	First Secretary

3. JICA South Africa Office

Mr. Takahashi Yoshiyuki	Resident Representative
Mr. Kito Koichi	Assistant Resident Representative
Ms. Shimohira Akiko	Project Formulation Advisor

4. Ministry of Health

Name	Position
Dr. Humberto A. Cossa	National Director, Directorate Planning and Cooperation
Dr. Alexandre Manguale	National Director Directorate of National Health
Dr. Jorge Fernando M. Tomo	Deputy National Director
Dr. Avertino T.L. Barreto	Deputy National Director
Mr. Manuel Matosse	Manager, EPI Department
Dr. Samuel Mabunda	Manager, National Malaria Control Programme
Dr. Joaquim Durão	Head of Pharmaceutical Department
Mr. Fernando Regulese	Assistant Director , Pharmaceutical Department
Dr. Kumudchandra Bachubhai	Assistant Director , Pharmaceutical Department
Dr. Momade Sumalgy	Head of Maintenance Department
Mr. Borger de Carvalho	Manager, Maintenance Training Division
Mr. Antonio Vasco Sitói	Head of Health Information Department
Mr. Alberto Dengo	Technician, Health Information Department
Ms. Arminda Banze	Central Laboratory (Quality Control)
Dr. Martinho Dgedge	Assistant Director, National Health Department
Mr. Bonafácio C. David Cossa	Technician, International Cooperation Division

5. Ministry of Foreign Affairs and Cooperation

Mr. Arthur Jossefa Jamo	Deputy Director, Directorate for Asia and Oceania
Ms. Ofelia Tembe	Secretary

6. Provincial Health Office , Nampula

Dr. Agostinho Anaunama	Provincial Health Officer
Mr. Emilio Jorge da Gama	Head of Health Department
Mr. Domingos Chiuenda	Head of Finance
Mr. Flizberto Muteca	Chief, EPI Division

7. Regional Medical Stores, Nampula

Name	Position
Mr. Jan Pierre	Director
Mr. Daitino Napaua Sarmili	Store Manager

8. District Health Office, Nacala Port City

Mr. Antonio Momad Salimo	District Health Office
Mr. Mario Ali	Staff, Statistical Division

9. Nacala General Hospital, Nampula Province

Mr. Augustinho Tome	Managing Director
Ms. Luiza Caetano	Pharmacy technician

10. Teterane Health Post, Meconta District

Irma Joanna	Director
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11. Namutequelua Health Post, Nampula City

Mr. Hector Tomas	Director
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12. 25 Setembro Health Center, Nampula City

Sr. Teresa Jaime	Director
Mr. Atanásio Manuel Caitóa	Pharmacy Technician

13. Xinavane Rural Hospital, Manica District, Maputo Province

Ms. Saquna Adamo	Medical Technician
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14. Central Equipment Stores, Ministry of Health

Mr. Joaquim Tchaono	Manager, Logistic Division, Ministry of Health
Mr. Elídio Mário Bilale	Deputy Director, Central Equipment Stores

15. medimoc

Dr. Renato Ronda	President and Chief Executive Office
Dr. Joel António Félix Napita	Director National Health
Mr. Vasco Pedro	Chief , National Health

16. WHO

Dr. Lieve van der Paal	Chief , Epidemiology
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17. UNICEF

Dr. Alejandro Gonzalez- Richmond	Health Office
Dr. Miguel Aragon	EPI Adviser
Mr. Mogan Munck	Cold Chain Adviser
Ms. Melanie Renshaw	Project Officer, National Malaria Control

18. USAID

Dr. Okey C. Nwanyanwu	Chief, Office of Health Population & Nutrition
Dr. Rose Macauley	EPI Adviser

19. Spanish Cooperation (Cooperación España)

Name	Position
Dr. Xavier Bosh	Deputy Director

20. PetroPharm

Mr. S. L. Petrou	Director General
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21. Zero Appliances (Pty) Ltd.

Mr. Luyton Driman	Key Account Manager
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