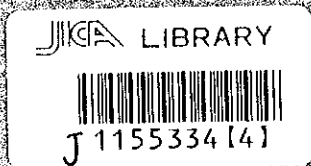


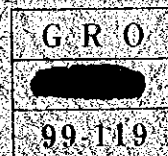
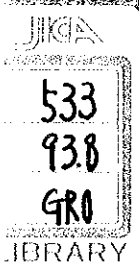
**STUDY REPORT  
ON  
THE GRANT AID FOR CHILD HEALTH**

**THE PROJECT FOR INTEGRATED MALARIA CONTROL  
INITIATIVE  
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March 1999



**Japan International Cooperation Agency (JICA)  
Japan International Cooperation System (JICS)**









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1155334 [4]

## PREFACE

In response to a request from the Government of Republic of Zambia, the Government of Japan decided to conduct a study on the Grant Aid for Child Health, Project for Integrated Malaria Control Initiatives and entrusted the Japan International Cooperation Agency ( JICA ) to conduct the study with the assistance of the Japan International Cooperation System ( JICS ).

JICA sent to Zambia a study team from October 28 to November 23 ,1999.

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 Zambia for their close cooperation extended to the team.

March 1999

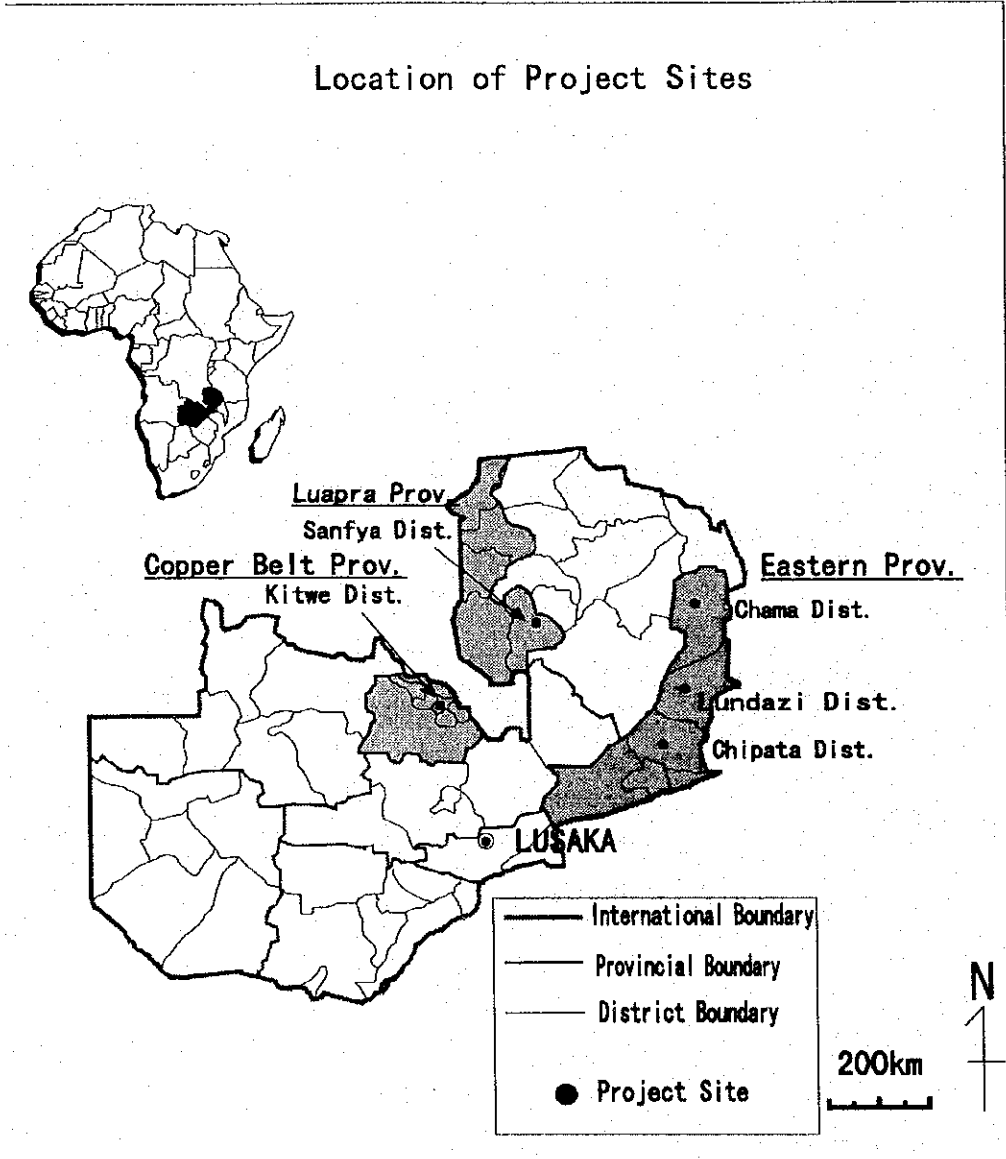
Kimio Fujita

President

Japan International Cooperation Agency

# Location Map

## Location of Project Sites





### Abbreviations

ARCH	Applied Research in Child Health
CBoH	Central Board of Health
CDC	Center for Disease Control and Prevention
CIMI	Copperbelt Integrated Malaria Initiatives
DHMT	District Health Management Team
DHO	District Health Office
EPIMI	Eastern Province Integrated Malaria Initiatives
IMI	Integrated Malaria Initiative
ITN	Insecticide Treated Mosquito Nets
LIMI	Luapula Integrated Malaria Initiatives
NHC	Neighbourhood Health Committee
NMCC	National Malaria Control Center
RHC	Rural Health Center
SFH	Society for Family Health
TDR	Tropical Disease Research Center
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
WHO	World Health Organization
ZIHP	Zambia Integrated Health Package
ZIHP-COMM	Communication and Community Partnerships
ZIHP-PASS	Politics Planning and Support System
ZIHP-SERV	Service Delivery and NGO Strengthen
ZK	Zambia Kwacha

**Report of the Survey on Equipment Supply for Child Health Grant Aid  
(the Project for Integrated Malaria Control Initiative)  
in the Republic of Zambia**

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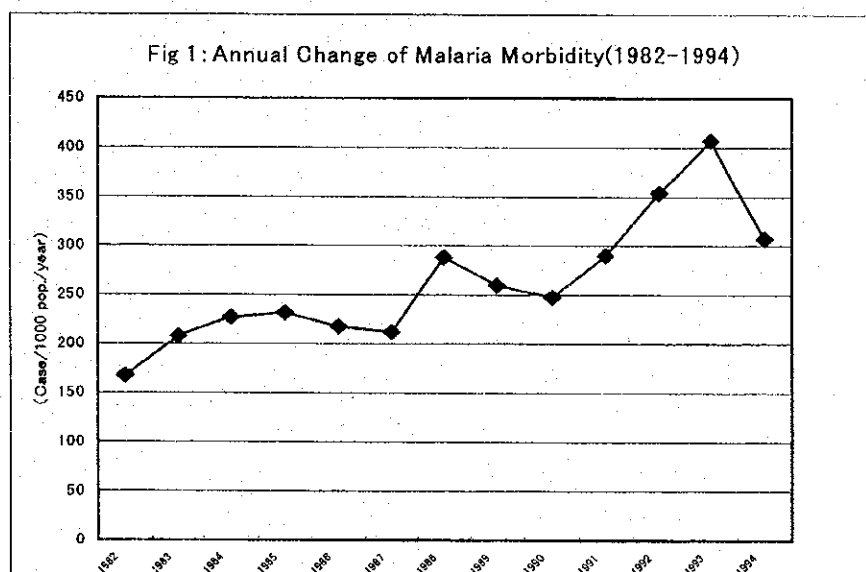
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## Chapter 1 Background of the Project

### 1-1 Current Conditions and Problems

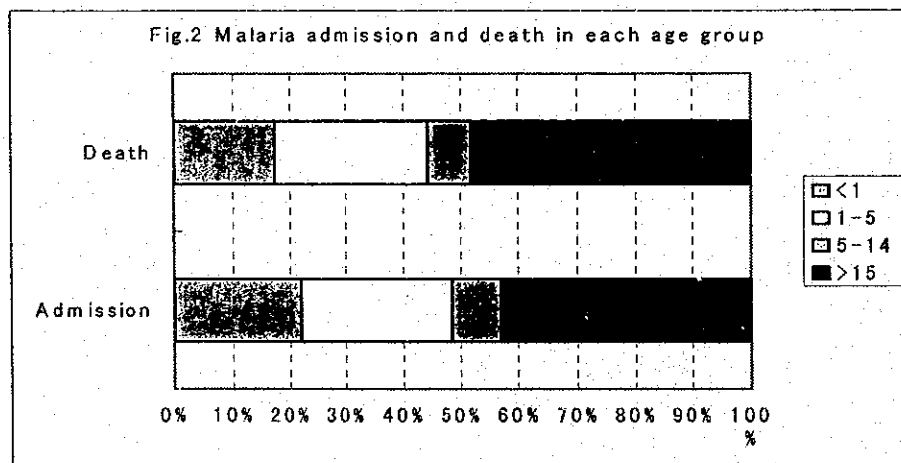
Malaria is the disease that most seriously threatens public health in Zambia; it continues to far outstrip any other disease in terms of the number of fatalities and morbidity, and this despite the fact that efforts to control it have been implemented over many years. The malaria morbidity rate was 138 per 1,000 of population (138/1000) in 1987, however, a figure of 407/1000 was recorded in 1993 and, although this fell to 288/1000 in 1995, the morbidity rate in recent years has generally been on the increase. Moreover, the malaria case fatality rate is also on the increase: whereas this stood at 12.47 per 1,000 malaria patients in 1982, this figure had risen to 43.48 per 1,000 by 1990.



(NMCC Epidemiological data)

Concerning the background to this increase in the number of malaria patients over the past 10 years, the main factor that can be raised is economic impoverishment brought about by decline in the international price of copper, which is the main product of Zambia. As a result, the effective practice of insecticide residual spraying in households, which has continued to put pressure on malaria epidemics, has become difficult and the malaria propagation rate has increased as a result. Moreover, shortages of drugs for treating malaria, and weakening of the grassroots transportation system brought about by budget limitations, have also contributed to the increased prevalence of the disease. In addition, an increase in plasmodium malaria resistant to chloroquine, which is an inexpensive antimalarial drug having few side effects, has also contributed to the increase in the malaria morbidity and fatality rates.

Looking at malaria epidemics by age group based on hospital statistics, children under the age of five account for approximately half of all hospitalization cases and fatalities, and this shows that malaria is having a major detrimental effect on the health of infants who have not acquired immunity from repeated infections. As to the reasons behind these high malaria morbidity and fatality rates among infants, it is thought that treatment is delayed due to a lack of awareness among residents in districts at risk from malaria infection, and that it is difficult for prompt diagnoses and appropriate treatment to be carried out due to shortages of antimalarial drugs and examination equipment in regional health centers. Furthermore, it is thought that low resistance brought about by poor nutrition and anemia arising from poverty is making cases of contraction worse than they need be and is contributing to the higher fatality rate.



In response to these conditions, the Ministry of Health of Zambia is carrying out measures to expand the functions of regional health centers (RHC) which provide primary treatment in rural areas, to nurture health workers, and to educate mothers, etc. However, even the basic activities for these malaria countermeasures cannot be carried out without cooperation from donors.

### 1-2 Background of the Request

In order to deal with malaria, which has a grave impact on the health of citizens and is a major hindrance to economic development in Zambia, the Ministry of Health compiled a plan of countermeasures based on the WHO World Malaria Countermeasures Strategy (adopted in 1992) and in accordance with the Project for Reform of Public Health and Sanitation Administration in Zambia. These countermeasures are based around prevention of infections through the distribution and dissemination of insecticide-treated mosquito nets, and the implementation of early diagnosis and appropriate treatment on the village level. The

Ministry of Health carried out study and research necessary for compilation of a malaria countermeasures strategy consistent with actual conditions in Zambia upon obtaining cooperation from USAID, UNICEF, and WHO, etc. Based on the findings of this study and research, small-scale distribution of mosquito nets was carried out on a test basis, and in October 1997 a decision was made to implement malaria countermeasures with support from USAID in three districts of Eastern Province (Chipata, Lundazi, and Chama). The implementation plan for the said countermeasures was compiled in March 1998, when it was decided to implement the malaria countermeasures pilot project with financial support from USAID.

Furthermore, in Kitwe district in Copper Belt Province, where epidemics of urban malaria are a problem, USAID is implementing small-scale malaria countermeasures aimed at reducing sources of malaria-carrying mosquito generation by draining marshes. In Samfya district in Luapula Province, UNICEF has been implementing malaria countermeasures through distributing insecticide-treated mosquito nets and educating citizens in a joint effort with the district board of health since 1995, and so far approximately 20,000 mosquito nets have been distributed with a positive effect being had in terms of preventing malaria infections among users. However, the above instances of donor support are mainly directed at software issues, and there is still not enough being done with respect to mosquito nets themselves and equipment necessary for transportation, examination and evaluation activities.

With a view to procuring the equipment necessary to strengthen and expand malaria countermeasures in the priority districts where the above-mentioned small-scale trial projects are being implemented, the Ministry of Health of Zambia made a request to the Government of Japan for the provision of grant aid. The Project is being planned under local cost and technical support by USAID and UNICEF and is viewed as part of the Integrated Malaria Initiative, which will be implemented by the Ministry of Health and local governments together with Japan and other donors each making the most of their unique strengths. It is anticipated that the Integrated Malaria Initiative will become a model for malaria countermeasures throughout the world in future.

## Chapter 2 Contents of the Project

### 2-1 Objectives of the Project

The Government of Zambia is planning to prevent malaria infections and bring down the malaria morbidity and fatality rates through distributing insecticide-treated mosquito nets, and it has selected the five districts of Chipata, Lundazi, Chama, Kitwe and Samfya as model districts to practice this. In the malaria implementation committee participated in by related agencies and the said five districts, the following objectives have been adopted: to reduce malaria infections, serious cases, and fatalities among infants of less than five by 35%, 45% and 10-15% respectively over the next five years.

Through procuring insecticide-treated mosquito nets and equipment and medical supplies necessary for conducting malaria diagnoses and treatment, the Project aims to contribute to the construction of a sustainable malaria prevention system in epidemic communities, and to reduce serious case and fatality rates among patients (in particular infants of less than five and pregnant women) by establishing effective diagnosis and treatment setups.

### 2-2 Basic Concept of the Project

The Project should become a model of the Integrated Malaria Initiative in Zambia. In addition to procuring mosquito nets, medical supplies and examination equipment necessary for preventing infections and reducing serious case and fatality rates among residents, especially high risk groups (infants under five and pregnant women) in the five target districts, the Project intends to procure transportation equipment capable of supporting a large-scale malaria countermeasures system.

The equipment to be procured has been classified into four groups according to the following purposes of use.

Table 1. Classification of Equipment to be Procured

No.	Purpose of Use	Main Items
1	Prevention of malaria infections	Mosquito nets, Insecticide treatment kits, Re-treatment kits
2	Treatment of malaria patients	Oral antimalarial drugs, Intravenous injection antimalarial drugs, Drip infusion sets
3	Malaria diagnosis	Microscopes, Blood specimen staining equipment, Laboratory consumables, etc.
4	Transportation	Vehicles, Motorcycles

The basic concept concerning setting of scale is given below.

## 1) Mosquito Nets and Insecticide for Prevention of Malaria Infection

The NMCC set the following target for distribution of mosquito nets over three years from the start of the Project, and it requested the Government of Japan to supply these nets.

- One mosquito net per household for 60% of all households (assuming six people per household, 1/6 of population = approximately 212,000 households)
- Two mosquito net per household for 30% of all households (i.e. half of all purchasers)

According to the above, 190,000 mosquito nets will be required. However, the supply quantity was recalculated upon taking the following facts which were made clear from the site survey into account.

1. The population of Samfya district, which was originally calculated as 222,000, was readjusted to 153,000. Accordingly, the overall benefiting population is 1,203,000 (compared to 1,272,000 in the official request).
2. Through financial support from USAID, 20,000 mosquito nets have been supplied to Eastern Province. Accordingly, the number of mosquito nets to be supplied to each of the three districts in the said Province shall be calculated upon deducting these 20,000 divided among the three districts according to the population share of each.
3. In Samfya district, UNICEF has already supplied and distributed 15,000 mosquito nets and the insecticide required to treat them, and 40,000 people are benefiting from this assistance. Since the target number of households differs between this UNICEF project and the Project here, the benefiting population per mosquito net is smaller. The benefiting population of the Project in this district shall be obtained by deducting the said 40,000 from the total district population.
4. The ratio of family size mosquito nets to extra family size mosquito nets shall be 1:3.

Since supply is predicated on repurchase by means of a revolving fund, it is not necessary to procure all the needed mosquito nets in the Project, however, the fund recovery rate should be estimated on the low side. In consideration of a disparity between the maker purchase price and retail price and the existence of losses and irrecoverable income, the SFH estimates that the actual recovery amount will be restricted to around 60% of the new purchase price. In other words, the money obtained from the sale of one mosquito net will suffice to purchase just 0.6 of a new mosquito net. Furthermore, since it is scheduled to distribute 30% of mosquito nets free of charge or at a low price to households which have no ability to pay (households containing infants under five, etc.), only 70% of all the procured mosquito nets will be used for sale. Accordingly, assuming that funds obtained from the complete sale of all initially procured mosquito nets are used to purchase the remaining necessary mosquito nets, the following expression can be established in which N stands for the initially procured quantity and P stands for population.

$$N + (0.6 \times 0.7 N) = (P/6) \times 0.9$$

$$\text{Therefore, } N = (P/6) \times 0.9 \times 0.704$$

$$\text{From 1. and 3. above, } P = 120.3 - 4 = 116.3$$

$$\text{Therefore, } N = 12.3 \text{ (10,000 nets)}$$

By deducting the 20,000 mosquito nets described in 2. from this figure, the number of mosquito nets to be procured under the Project comes to 103,000. Insecticide treatment kits shall be included in the mosquito net packages. Since the insecticide stops working one year after application, re-treatment kits shall be procured. The number of re-treatment kits has been set at 70% of the total number of mosquito nets to be supplied by Japan and USAID. Incidentally, it is intended to sell the mosquito nets and insecticide each with their respective SFH trademarks attached (Powernet/Powerchem).

## 2) Equipment/Materials for Treatment (Medicines)

Concerning antimalarial drugs, the request originally specified a mixture of sulfadoxine and pyrimethamine (SP mix), however, in consideration of the occurrence of malaria strains resistant to drugs and the current situation regarding drugs distribution by the Ministry of Health, it has been decided to procure other antimalarial drugs in order to build an appropriate treatment system.

Since sanitation-related statistics are not fully maintained, it is not possible to obtain a grasp of actual figures, however, the NMCC estimates that the number of malaria patients in the targeted districts accounts for between 30-50% of the population. Moreover, it has been reported from past studies that malaria with resistance to chloroquine, the first choice antimalarial drug, accounts for 60% of all cases, and examination is even being carried out with a view to replacing chloroquine with SP mix as the first choice antimalarial drug.

Since the first choice antimalarial drug of chloroquine can be procured through local self efforts and the site survey has confirmed that almost no problems exist regarding the supply of this drug, the Ministry of Health decided not to include chloroquine in the request. In the Project, as the second choice drug to be used in the treatment of patients who do not recover through administration of chloroquine, it has been planned to supply enough SP mix for the treatment of 40% of the population. Since it is thought that implementation of the Integrated Malaria Initiative will lead to an improvement in awareness among citizens, development of the examination setup, and discovery of more patients, this quantity is by no means excessive.

Moreover, since resistance to SP mix too has been reported in around 10% of cases in recent years, it has been decided to also include quinine tablets, which are used in cases where treatment by SP mix has no effect, in the Project. These oral antimalarial drugs shall be supplied to health centers and district hospitals, and they shall be aggressively used in order to prevent worsening of cases as a result of chloroquine-resistant malaria. Furthermore, in cases



where infants contract tropical malaria, since this often leads to complications and death, it has been decided to also procure drip quinine, 5% glucose solution (for dilution), and drip sets. The drip quinine shall only be distributed to hospitals where physicians are assigned. It is planned to procure a two-year supply of the above drugs in the Project.

The equipment and materials to be used in malaria treatment shall be placed under the control of district boards of health and they shall be supplied to health centers and hospitals according to consumption rates.

**Table 2. Quantity of Antimalarial Drugs to be Procured**

Item	Assumed Patients	Dose	Years	Formula
Sulfadoxine500mg·Pyrimethamine25mg	40% of Total Population of the District(P)	3 tablets	2	$P \times 0.4 \times 3 \times 2$
Quinine 300mg tablet	10% of patients treated by SP tab =4% of (P)	24 tablets	2	$P \times 0.04 \times 24 \times 2$
Quinine 300mg/ml injection	2% of patients treated by SP tab =0.8% of (P)	1 ampoule	2	$P \times 0.008 \times 1 \times 2$
Glucose5% infusion·500ml	diito	2 bags	2	$P \times 0.008 \times 2 \times 2$

### 3) Equipment for Malaria Examination

High precision examinations are important not only for providing appropriate treatment, but also for securing epidemiological information that provides the basis for evaluating disease countermeasures. In the Project, microscopes and other related equipment are essential items for carrying out final diagnoses on feverish patients suspected of having contracted malaria and patients who do not recover following administration of antimalarial drugs.

Ideally speaking, it is desirable for microscope examination systems to be introduced to all medical care facilities, however, in the current situation it is necessary to consider budget and personnel restrictions. Therefore, with a view to establishing one laboratory per approximately 30,000 of the background population, it has been decided to procure 44 microscopes and related equipment for supply mainly to district hospitals and core health centers in each district.

The laboratories attached to the health centers which were visited in the site survey all use deteriorated microscopes and handmade apparatus to carry out examinations, but it is thought that these facilities would make effective use of new equipment if it is introduced. In those health centers where new laboratories are to be established, too, it has already been decided to train and assign examination technicians through district budgets and to carry out training courses at the NMCC and district hospitals.

In order to raise detection precision, the Project microscopes shall basically be the binocular bulb type, and solar systems shall be procured for those health centers which are not served by a steady electricity supply.

Moreover, in order to aid the effective implementation of malaria countermeasures, it is planned to introduce four monitoring microscopes to the NMCC (one to headquarters and three to IMI). These microscopes shall be used to regularly carry out fixed point surveys in the Project target area, grasp malaria infection rates among infants who are most prone to malaria epidemics, and evaluate countermeasure activities. Moreover, as well as including four stereo microscopes for use in identifying malaria-carrying mosquitoes, one biological microscope with attached camera, one biological stereo microscope, and one biological microscope with video recorder shall be supplied for use in training and teaching materials preparation purposes at NMCC.

Table 3 shows the current state of microscope distribution and the number of microscopes to be procured under the Project. Only a few facilities possess microscopes in good working order, while the trial estimate of the number of required microscopes has been used as the number to be procured under the Project. Moreover, since Samfya is located in a malaria high risk area and, irrespective of population, it is necessary to give priority to the establishment of examination functions at the health center here, which is located on low marshy land where mosquitoes like to breed, the Project quantity exceeds the estimated figure. The number of solar systems has been obtained upon excluding facilities with a sure supply of electricity from those health centers and hospitals where microscopes are to be supplied. Moreover, one solar system shall be supplied for field survey work to the NMCC headquarters.

Table 3. Current state of microscope distribution and the number to be procured

District	Number of existing microscope			Number of unit to be procured							
	Total	Condition		Number of health centers including national/district hospitals			Request from gov't	Request from district	Number required =P/30,000	Number to be procured	
		good	poor	with power supply	without power	total				Body	Solar
Chipata	5	2	3	8	20	28	5	30	12	12	9
Lundazi	6	3	3	1	21	22	4	13	7	7	7
Chama	1	?	?	1	15	16	1	10	3	3	3
Kitwe	4+	?	?	19	0	19	7	5	14	14	0
Samfya	9	?	?	6	13	19	8	14	6	8	6
NMCC(Lusaka)	4	1	3			---	1	---	---	1	1
NMCC(EPIMI)	0	0	0			---	1	---	---	1	0
NMCC(CIMI)	0	0	0			---	1	---	---	1	0
NMCC(LIMI)	0	0	0			---	1	---	---	1	0
Total				35	69	104	29	72	42	48	26

The officer in charge of malaria examinations at the Ministry of Health CBoH estimates that approximately 30% of malaria patients visit medical care facilities that possess a laboratory. In the Project, however, it is assumed that the number of patients receiving examinations will increase to 40% as a result of expansion of examination functions, and it has been decided to procure enough expendable supplies (blood lancets, slide glasses, etc.) to deal with 40% of the number of malaria patients visiting each laboratory each year (40% of background population = 12,000 x 40% = 4,800). Table 4 compiles the basis behind calculation of these expendable supplies and equipment for use in examinations.

**Table 4. Basis behind calculation of laboratory supplies and equipment**

① Background population per lab.	=	30,000
② Patients in the coverage area	① x 40% =	12,000
③ Patients to visit the lab.	② x 40% =	4,800
④ Examination cases by NMCC	200 patient x 10 spots x 2 times x 5 districts =	20,000

Item	Quantity required per patient ⑤	Q'ty for 2 years ⑥ = ③ x ⑤ x 2	Q'ty per package ⑦	Q'ty to be procured ⑧ / ⑦	for NMCC ④ x ⑤ x 2 / ⑦
Lancet	1 pc.	9,600	200 pc./box	48 box	200 box
Cotton	1.2 g	11,520	500 g/roll	24 roll	100 roll
Isopropanol	1.2 ml	11,520	1,000 ml/bottle	12 bottle	50 bottle
slide glass	2 pc.	19,200	3,000 pc./box	6.4 box	27 box
Giemsa stain	0.02 g	192	100 g/bottle	2 bottle	8 bottle
Glycerol	1.8 ml	17,280	3,000 ml/bottle	6 bottle	24 bottle
Buffer tablet	0.06 tab.	576	100 tab./bottle	6 bottle	24 bottle
Methanol	1.8 ml	17,280	3,000 ml/bottle	6 bottle	24 bottle
Field A stain	0.18 g	1,728	100 g/bottle	18 bottle	72 bottle
Field B stain	0.18 g	1,728	100 g/bottle	18 bottle	72 bottle
Immersion oil	0.12 ml	1,152	100 ml/bottle	12 bottle	48 bottle
Xylene	0.4 ml	3,840	500 ml/bottle	8 bottle	32 bottle

Following laboratory equipment will be procured. Number distributed per laboratory is shown in ⑧.  
For NMCC, 4 times as much as ⑧ is procured because examination cases of NMCC is almost equivalent to those of 4 health centers.

Item	Quantity required per patient	Q'ty for 2 years	Q'ty per package	Q'ty to be procured per lab. ⑧	for NMCC ⑧ x 4
Pencil			12 /box	4 box	20 box
Lens cleaning tissue			100 /box	8 box	32 box
Beam balance				1 unit	4 unit
Maintenance tool set				1 set	4 set
Staining jar				8	32
Slide draining rack				4	16
Staining vessel				4	16
Reagent bottle				4	16
Bottle with dropper				4	16
Slide box				4	100
Graduated cylinder/beaker				2 set	8 set

Additional equipment: One set of scale for infant and adult will be delivered to each health center (100 in total).  
One electrical balance will be procured for NMCC.

#### 4) Transportation Equipment

##### (a) Pickup Trucks

Means of public transport are not well developed in the Project area. The main arterial roads are paved, however, since almost all roads in the communities are unpaved, four-wheel-drive vehicles are necessary especially during the rainy season when malaria epidemics are apt to occur. Moreover, the poor state of roads means that vehicles soon suffer from wear and tear. Since mosquito nets and insecticide, which are the most important items to be supplied under the Project, can only be effective if they are distributed to citizens on the grassroots level, it is essential from the viewpoint of smooth Project execution to secure, maintain and manage a system of transportation to the villages. Since it is necessary to make repeated visits to villages in order to carry out sustained activities (paid delivery of mosquito nets, dissemination work, insecticide re-treatment, etc.), the supply of pickup trucks to each district health center was included in the request.

**Table 5. Current vehicle operating conditions**

District	Existing number of vehicle (excluding non-repairable units)							Number requested	Number to be procured
	Total	Good	Poor / under repair	Breakdown					
				type	model	condition	allocation		
Chipata	2	1	1	truck-2t	1996	good	DHO	1	1
				station wagon	1995	under repair	DHO		
Lundazi	3	1	2	station wagon	1993	good	DHO	1	1
				pickup	1994	poor	hospital		
				pickup	1993	under repair	RHC		
Chama	1	1	0	station wagon	1998	good	DHO	1	1
Kitwe	9	5	4	station wagon	1998	good	DHO	1	1
				pickup	1994	good	DHO		
				jeep	1998	good	DHO		
				jeep	1995	good	DHO		
				sedan	1995	good	DHO		
				jeep	1996	under repair	DHO		
				jeep	1992	under repair	DHO		
				pickup	1997	under repair	DHO		
jeep	1992	poor	DHO						
Samfya	1	0	1	station wagon	1993	poor	DHO	1	1
NMCC (Lusaka)	2	1	1	pickup	1990	good	NMCC	1	1
				station wagon	1992	under repair	NMCC		
NMCC(EPIMI)	2	2	0	pickup	1998	good	EPIMI	0	0
NMCC(CIMI)	0	0	0					1	1
NMCC(LIMI)	0	0	0					1	1

Upon hearing reports of current vehicle operating conditions from each district representative, it was found that only one vehicle each is operating in good condition in the

three districts of Eastern Province while there are no operable vehicles at all in Samfya. When one considers the increased load on district health centers resulting from the distribution of mosquito nets and monitoring activities, it is thought that supply of one vehicle to each district is appropriate. In Kitwe district, too, almost all vehicles currently in operation have been supplied by donors for specific ongoing health projects, and it will not be possible to divert these for frequent use in the Project (see Table 5).

In addition to the above, it has been decided to supply vehicles to the NMCC/IMI for regular fixed point surveys and monitoring. It is planned to assign one vehicle each to the NMCC headquarters and each IMI (the EPIMI shall, however, be excluded from the Project because they already possess vehicles). The vehicles intended for the IMI shall also be used for transporting mosquito nets in a joint effort with the district health centers. For the sake of smooth Project implementation, USAID, which is the major partner in the Project, has set aside a budget to cover the fuel and maintenance costs of the Project vehicles to be supplied by Japan.

#### **(b) Motor Cycles**

There is a great necessity for motor cycles to link health centers and communities and to enable activities such as the transportation of mosquito nets, retrieval of sales returns, and dissemination, education and monitoring to be carried out. Upon surveying the existing motor cycles, it was found that only a small number are operating in good condition (see Table 6). Since motor cycles will be used in poor road conditions in the Project, service life is dramatically shortened compared to motor cycles used in cities, and there are many cases where after just two or three years, machines become so worn out that they cannot be repaired. Therefore, motor cycles should be treated as expendable items limited to the period of implementation of the Integrated Malaria Initiative (until the end of 2002).

However, the requested number of 99 motor cycles is excessive. If such a large number were supplied in one batch, some may be stolen due to inadequate control at district health centers, others may be used for uses other than public health and medical care, and there is a danger that maintenance costs would become too large. Accordingly, it has been deemed appropriate to only supply motor cycles to those health centers equipped with laboratories, i.e. health centers which will play a core role in malaria countermeasure activities, and to subtract the number of motor cycles in operation since 1997 from the number of such health centers. Moreover, because central Kitwe is served by a good public transportation system, motor cycles shall only be supplied to two core health centers. It was also requested to provide motor cycles to the IMI, however, since it is deemed that IMI activities can adequately be executed using vehicles alone, these have been excluded.

**Table 6. Current motorcycle operating conditions**

District	Existing number of motorcycle							RHC	Number requested	Laboratory (n)	Number to be procured n-97model
	total	good	Poor / under repair	out of order	breakdown						
					model	No.	condition				
Chipata	17	0	1	16	1997	1	poor	27	28	12	11
					1996	13	out of order				
					1992	1	out of order				
					1991	1	out of order				
					1987	1	out of order				
Lundazi	7	2	5	0	1997	2	good	21	20	7	5
					1996	2	under repair				
					1995	1	good				
					1993	2	good				
Chama	5	0	0	5	1995	1	out of order	15	14	3	3
					1994	3	out of order				
					1988	1	out of order				
Kitwe	0	0	0	0				18	18	14	2
Samfya	7	0	1	6	1994	5	out of order	19	19	8	8
					1991	1	out of order				
					1990	1	poor				
					1990	1	out of order				
NMCC(Lusaka)	0	0	0	0				---	0	0	0
NMCC(EPIM)	0	0	0	0				---	0	0	0
NMCC(CIM)	0	0	0	0				---	0	0	0
NMCC(LIM)	0	0	0	0				---	0	0	0
Total	36	2	7	27				100	99	44	29

## 2-3 Basic Design

### 2-3-1 Design Concept

#### 1) Concept Regarding Natural Conditions

Although the country has a tropical climate, because the Project area is located on slightly high ground, it is not always hot and humid. However, in view of the fact that average humidity exceeds 80% during the rainy season from December to April, it is necessary to select microscopes that have been given mildew-proof finishing.

#### 2) Concept Regarding Social Conditions

The insecticide treatment of mosquito nets will be carried out by the citizens themselves, however, since this is rather complicated work and care is required when handling the insecticide, multi-colored illustrated guides shall be attached to the treatment kits and mosquito nets. Local languages shall be used to write the text of such guides; therefore, Nyanja shall be used in the three districts in Eastern Province, and Bemba shall be used in Samfya and Kitwe.

#### 3) Concept Regarding Adoption of Third Country Products

Japanese mosquito nets are four times more expensive than mosquito nets made in third countries. Since a large number of mosquito nets are to be procured under the Project and it is hoped to make effective use of available funds, third country products shall be procured for

the Project. Antimalarial drugs shall also be procured in a third country because they are not produced in Japan.

#### **4) Concept Regarding Operation and Maintenance**

The district health centers carry out their own vehicle repairs as a cost cutting measure, however, because they do not possess sufficient tools, basic tool sets shall be supplied in the Project in order to strengthen servicing capacity. Since working conditions in the Project area are extremely hard, it should be remembered that vehicles will have a shorter service life (around five years) than they would in urban areas. The motor cycles will become unusable in around three years. The Integrated Malaria Initiative is a program planned for implementation until 2002, and the vehicles and motor cycles should be treated as expendable items for limited use during this period only. The operation and maintenance setups within health centers certainly contain problems, however, if the supply of equipment was to be limited for this reason, this may hinder execution of the Project overall.

Electrification has still not been achieved in most areas except for Kitwe, and many laboratories have no choice but to use car batteries as power sources for microscopes. In these cases, since batteries must be taken to towns with recharging facilities to undergo recharging, great time and effort are invested in operation and maintenance. In the Project, this burden shall be relieved through the introduction of solar batteries, and it shall also be possible to supply microscopes to rural health centers which previously did not possess any laboratory facilities. Incidentally, the solar systems themselves shall be fixed, maintenance-free package systems.

#### **5) Concept Regarding Setting of Models and Grades**

##### **1) Vehicles and Motor Cycles**

In districts other than Kitwe, road conditions away from arterial roads are extremely poor. The roads linking health centers to communities are in especially bad condition and since there are many districts inaccessible to normal vehicles, the pickup trucks to be procured in the Project shall be the four-wheel-drive type, and the motor cycles shall be the agricultural model trail type, which is robust in off-road conditions and has good suspension. This agricultural model motor cycle is the most commonly used means of transportation by agricultural advisors and health workers in Zambia.

##### **2) Mosquito Nets**

Polyester, 100 denier-156 mesh mosquito nets shall be procured. Products which comply with standard specifications of United Nations agencies shall be selected.

##### **3) Antimalarial drugs**

Authorization of medical supplies is the responsibility of the Pharmacy, Medicines and

Poisons Board. As a rule only registered products can be imported by registered operators, however, since the WHO Medical Supplies Assistance Guidelines apply to imports of assistance products, there is no problem regarding procurement by a Japanese trading company. In accordance with these guidelines, the items to be procured shall be selected from the "List of Essential Medical Supplies in Zambia" and it shall be obligatory for potential suppliers to present WHO medical supply certificates issued by public agencies in the country of origin. Moreover, countries of origin must be reliable DAC members with a good reputation in terms of quality.

#### 4) Insecticide

Six insecticides are recognized as applicable to mosquito nets by WHO and are registered in Zambia. However, the Zambia side has requested insecticides that remain effective one year after application, and only two products satisfy this requirement (the others are only effective for 6-9 months). Since insecticide will be distributed at a cost in the Project, it is necessary to minimize product cost and transportation and storage expenses as much as possible, so the request is deemed to be appropriate.

#### 5) Microscopes

Since it is necessary to use a magnification of 1,000 when investigating malaria bacteria, the view is too dark and efficiency and accuracy decline when natural light is used. Microscopes which use halogen bulbs as the light source shall be selected in the Project, however, specifications shall be such that they are adaptable to use with AC 230 V, DC 12 V and natural light (reflecting mirror) and can be used under any conditions.

### 2-3-2 Basic Design

#### 1) Overall Plan

The SFH shall have overall control of mosquito nets and insecticide. Quantities compliant with sales in each district shall be kept on hand at each IMI, from where they shall be distributed to each health center. Antimalarial drugs and expendable items for inspections shall be stored and managed by the district health centers, which shall supply the necessary amounts to appropriate medical care and examination facilities. Other equipment and materials shall also be largely managed by the district health centers, however, it is planned for motor cycles and examination equipment to be supplied to existing examination facilities and also core health centers which are to be newly given examination functions.

Moreover, examination equipment and survey vehicles shall be supplied in order to strengthen functions of the NMCC.

Table 7 gives a breakdown of the equipment and materials to be distributed to each district and NMCC.



**Table 7. List of the equipment and supplies to be distributed to each district and NMCC**

No.	Item	Allocation						Total Quantity
		NMCC	Chipata	Lundazi	Chama	Kitwe	Samfya	
<b>Insecticide Treated Mosquito Nets</b>								
1	Mosquito net, family size	0	6,700	4,000	1,600	10,700	3,000	26,000 pcs.
2	Mosquito net, extra-family size	0	19,900	11,900	4,700	31,900	9,000	77,400 pcs.
3	Insecticide treatment kit	0	26,600	15,900	6,300	42,600	12,000	103,400 sets
4	Re-treatment kit	0	26,200	15,800	6,300	29,900	8,400	86,600 sets
<b>Antimalarial drugs</b>								
5	Sulfadoxine500mg+pyrimethamine25mg (1000tab./bottle)	0	850	510	200	970	370	2,900 bottles
6	Quinine sulfate, 300mg (1000tablets/bottle)	0	680	410	160	780	300	2,330 bottles
7	Quinine injection, 300mg/ml, 2ml(as dihydrochloride)/amp.	0	5,700	3,400	1,400	6,500	2,500	19,500 amp.
8	Glucose 5%, for intravenous infusion, 500ml/pack	0	11,400	6,800	2,800	13,000	5,000	39,000 packs
9	Intravenous giving set, standard	0	6,800	4,100	1,700	7,800	3,000	23,400 sets
10	Intravenous giving set, pediatric	0	6,800	4,100	1,700	7,800	3,000	23,400 sets
11	Surgical tape, 12mmx9m, 24rolls/box	0	12	7	3	13	5	40 boxes
<b>Transportation</b>								
12	Pick-up truck, double cabin, diesel, 4WD, 2,800 cc class	3	1	1	1	1	1	8 units
13	Motorcycle, agriculture model, 100-125cc class	0	11	5	3	2	8	29 units
14	Mechanic tool set, for regular maintenance	0	1	1	1	1	1	5 sets
<b>Laboratory Equipment</b>								
15	Binocular microscope	4	12	7	3	14	8	48 units
16	Solar power unit for microscope	1	9	7	3	0	6	26 sets
17	Binocular microscope with photo system	1	0	0	0	0	0	1 unit
18	Binocular microscope with TV system	1	0	0	0	0	0	1 unit
19	Zoom stereo microscope	4	0	0	0	0	0	4 units
20	Zoom stereo microscope with photo system	1	0	0	0	0	0	1 unit
21	Beam balance, 0.01g-300g	4	12	7	3	14	8	48 units
22	Electronic balance, 0.001g-300g	1	0	0	0	0	0	1 unit
23	Scale set for infant and adult	0	27	21	15	18	19	100 sets
24	Maintenance tool set for laboratory equipment	4	12	7	3	14	8	48 sets
25	Staining jar, glass with lid, for 5 slides	32	96	56	24	112	64	384 units
26	Slide draining rack, stainless steel, for 20 slides	16	48	28	12	56	32	192 units
27	Staining vessel, for15 slides, with stainless basket	16	48	28	12	56	32	192 units
28	Reagent bottle, glass, amber, 500ml	16	48	28	12	56	32	192 units
29	Bottle with dropper, amber glass, rubber bulb, 120ml	16	48	28	12	56	32	192 units
30	Microscope slide box, for 100 slides, plastic	100	48	28	12	56	32	276 units
31	Graduated cylinder and beaker set	8	24	14	6	28	16	96 sets
<b>Laboratory Supplies</b>								
32	Blood lancet (200 pcs/box)	200	580	340	150	680	390	2,340 boxes
33	Absorbent cotton (500g/pack)	100	290	170	80	340	200	1,180 packs
34	Isopropanol,70% (500 or 1000 ml/bottle)	50	150	90	40	170	100	600 liter
35	Frosted end microscope slide (3000 pcs/box)	27	77	45	20	90	52	311 boxes
36	Pencil (12/pack)	20	50	30	20	60	40	220 packs
37	Giemsa powder (100g/bottle)	8	24	14	6	28	16	96 bottles
38	Glycerol, GR (3 liter/bottle)	24	72	42	18	84	48	288 bottles
39	Buffered tablet, pH7.2 (100 tablets/bottle)	24	72	42	18	84	48	288 bottles
40	Methanol, GR, 99.8% (3 liter/bottle)	24	72	42	18	84	48	288 bottles
41	Field "A" stain powder (100g/bottle)	72	216	126	54	252	144	864 bottles
42	Field "B" stain powder (100g/bottle)	72	216	126	54	252	144	864 bottles
43	Immersion oil (100ml)	48	144	84	36	168	96	576 bottles
44	Xylene, GR (500ml/bottle)	32	96	56	24	112	64	384 bottles
45	Lens cleaning tissue (20 x 30mm) (100pks/box)	32	96	56	24	112	64	384 boxes

**Table 8. Summary of the goods to be procured**

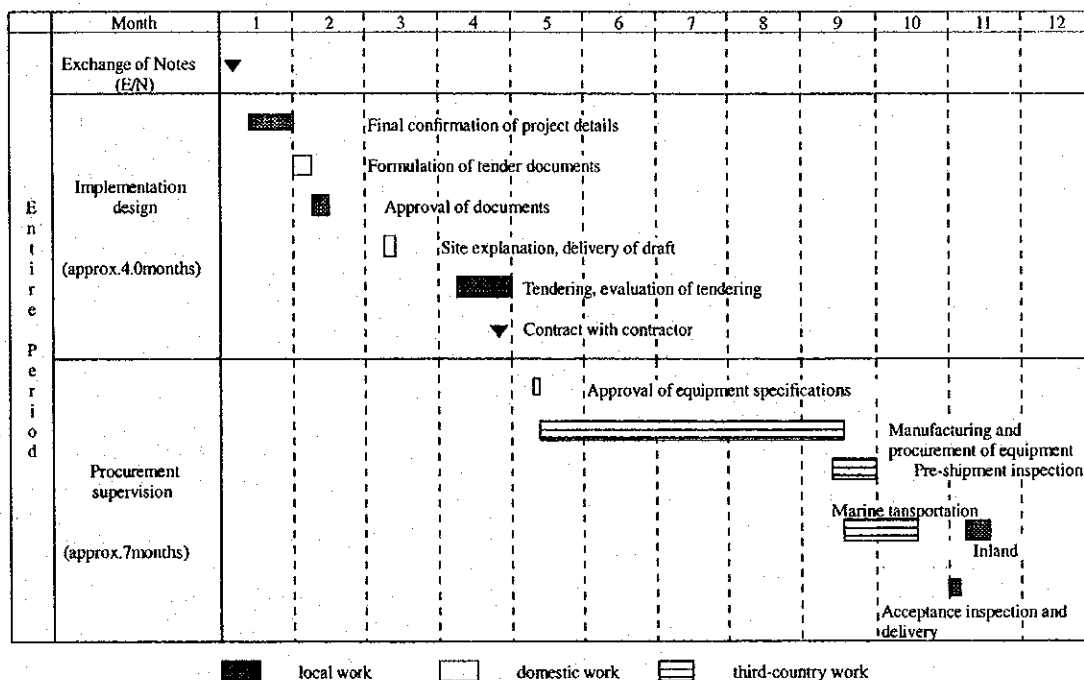
No.	Item	Purpose of use	Total Quantity
	Insecticide Treated Mosquito Nets		
1	Mosquito net, family size	Prevention of malaria. Distributed by social marketing	26,000 pcs.
2	Mosquito net, extra-family size	Prevention of malaria. Distributed by social marketing	77,400 pcs.
3	Insecticide treatment kit	Prevention of malaria. Distributed by social marketing	103,400 sets
4	Re-treatment kit	Prevention of malaria. Distributed by social marketing	86,600 sets
	Antimalarial drugs		
5	Sulfadoxine500mg+pyrimethamine25mg (1000tab./bottle)	Treatment of malaria patient	2,900 bottles
6	Quinine sulfate, 300mg (1000tablets/bottle)	Treatment of malaria patient	2,330 bottles
7	Quinine injection, 300mg/ml, 2ml(as dihydrochloride)/amp.	Treatment of malaria patient	19,500 amp.
8	Glucose 5%, for intravenous infusion, 500ml/pack	Diluent of quinine injection	39,000 packs
9	Intravenous giving set, standard	Injection of glucose	23,400 sets
10	Intravenous giving set, pediatric	Injection of glucose	23,400 sets
11	Surgical tape, 12mmx9m, 24rolls/box	Fixation of givinvr set	40 boxes
	Transportation		
12	Pick-up truck, double cabin, diesel, 4WD, 2,800 cc class	Transportation of ITN, monitoring, IEC, monitoring	8 units
13	Motorcycle, agriculture model, 100-125cc class	Transportation of ITN, monitoring, IEC, monitoring	29 units
14	Mechanic tool set, for regular maintenance	Repair of vehicles/motorcycles	5 sets
	Laboratory Equipment		
15	Binocular microscope	Malaria diagnosis	48 units
16	Solar power unit for microscope	Power source for the lab. without electricity	26 sets
17	Binocular microscope with photo system	Research & training of laboratory technician	1 unit
18	Binocular microscope with TV system	Research & training of laboratory technician	1 unit
19	Zoom stereo microscope.	Research & training of laboratory technician	4 units
20	Zoom stereo microscope with photo system	Research & training of laboratory technician.	1 unit
21	Beam balance, 0.01g-300g	Weighing reagents	48 units
22	Electronic balance, 0.001g-300g	Weighing reagents at rural lab.	1 unit
23	Scale set for infant and adult	Proper administration of antimalarial drugs	100 sets
24	Maintenance tool set for laboratory equipment	Maintenance of electrical equipment	48 sets
25	Staining jar, glass with lid, for 5 slides	Malaria diagnosis	384 units
26	Slide draining rack, stainless steel, for 20 slides	Malaria diagnosis	192 units
27	Staining vessel, for15 slides, with stainless basket	Malaria diagnosis	192 units
28	Reagent bottle, glass, amber, 500ml	Malaria diagnosis	192 units
29	Bottle with dropper, amber glass, rubber bulb, 120ml	Malaria diagnosis	192 units
30	Microscope slide box, for 100 slides, plastic	Malaria diagnosis	276 units
31	Graduated cylinder and beaker set	Malaria diagnosis	96 sets
	Laboratory Supplies		
32	Blood lancet (200 pcs/box)	Malaria diagnosis	2,340 boxes
33	Absorbent cotton (500g/pack)	Malaria diagnosis	1,180 packs
34	Isopropanol,70% (500 or 1000 ml/bottle)	Malaria diagnosis	600 liter
35	Frosted end microscope slide (3000 pcs/box)	Malaria diagnosis	311 boxes
36	Pencil (12/pack)	Malaria diagnosis	220 packs
37	Giemsa powder (100g/bottle)	Malaria diagnosis	96 bottles
38	Glycerol, GR (3 liter/bottle)	Malaria diagnosis	288 bottles
39	Buffered tablet, pH7.2 (100 tablets/bottle)	Malaria diagnosis	288 bottles
40	Methanol, GR, 99.8% (3 liter/bottle)	Malaria diagnosis	288 bottles
41	Field "A" stain powder (100g/bottle)	Malaria diagnosis	864 bottles
42	Field "B" stain powder (100g/bottle)	Malaria diagnosis	864 bottles
43	Immersion oil (100ml)	Malaria diagnosis	576 bottles
44	Xylene, GR (500ml/bottle)	Malaria diagnosis	384 bottles
45	Lens cleaning tissue (20 x 30mm) (100pks/box)	Malaria diagnosis	384 boxes

## Chapter 3 Implementation Plan

### 3-1 Implementation Plan

#### 3-1-1 Implementation Schedule

Table 9. Implementation Schedule



#### 3-1-2 Obligations of the Recipient Country

The items to be borne by the Zambia side in implementation of the Project are as given below:

1. to conclude a banking arrangement;
2. to ensure prompt unloading and customs clearance of the supplied equipment and materials, and to bear the expenses incurred thereof;
3. to ensure the prompt and appropriate delivery and installation of supplied equipment and materials to each facility, and to bear the expenses incurred thereof;
4. to exempt the supplied equipment and materials and supply work from tariffs and domestic taxes;
5. to provide any conveniences required for the entry to Zambia and stay therein of Japanese nations involved in the supply of equipment and materials;
6. to ensure the appropriate maintenance and utilization of the supplied equipment;
7. to secure the budget and personnel necessary for operation and maintenance; and
8. to appropriately manage and report to the Government of Japan on the revolving fund generated by the sale of mosquito nets and insecticide kits

### 3-2 Operation and Maintenance Plan

#### 1) Storage, Operation and Maintenance of Equipment and Materials

##### a) Mosquito Nets and Insecticide Kits

The SFH shall secure a warehouse in Lusaka to store the supplied mosquito nets and insecticide kits. Distribution from the warehouse to the IMI and district health centers shall as a rule be carried out by the SFH, however, regarding the portion to be supplied to Samfya district, consideration is being given to the idea of UNICEF bearing some of the storage and transportation burden. From the viewpoint of Project uniformity, however, it is not desirable that UNICEF manages the storage and transportation of all the mosquito nets and insecticide kits for Samfya; the basic rule shall be that the SFH has overall control over inventory control and additional orders. Transportation from IMI and district stores to each RHC is currently carried out by the IMI, however, since it is thought that the number of target communities will increase dramatically as a result of Project implementation, thus making this work more difficult, the vehicles to be supplied to each district shall also be utilized for this purpose.

##### b) Medical Supplies and Investigation Equipment

Medical supplies and investigation equipment shall be supplied to each district health center under the Project, but transportation from there to the health centers shall be the responsibility of the local side. Antimalarial drugs and expendable items for investigations, etc. shall be stocked on the district level and appropriately supplied as shortages occur.

##### c) Vehicles and Motor Cycles

Vehicles and motor cycles shall be managed by the DHMT in each district. Since the maintenance setup on the district level cannot be described as adequate, tool sets shall be supplied as a strengthening measure. Fuel costs and operation and maintenance expenses are as a rule covered from each district budget, however, USAID is able to carry part of the burden.

Table 10. Destination of the goods and parties responsible for storage and operation

Item	Destination by the grant			Final destination (○ : storage only, ● : to be used for operation, ▲ : In plan)						
	Lusaka		Districts	Lusaka		Districts				
	SFH	NMCC	DHO	SFH	NMCC	IMI	DHO	District hospital	RHC	
									w/ lab.	w/o lab.
Mosquito net, treatment kit	○			○		○	○		○	○
Antimalarial drugs			○					●	●	●
Pickup		○	○		●	●	●			
Motorcycle		○	○		●	●			●	●
Laboratory equipment		○	○		●	▲		●	●	▲
Laboratory consumables		○	○		●	▲	○	●	●	▲

Fuel costs account for between 5-10% of overall district budgets, however, almost the same amount is spent on repairing deteriorated vehicles, and this is putting much pressure on finances. If new vehicles and spare parts are procured through the Project, the consequent reduction in repair costs will offset the increase in fuel costs for the immediate future.

Moreover, vehicles and motor cycles intended for the NMCC and IMI offices under its control shall be managed by the NMCC. The operation and maintenance costs for these vehicles and motor cycles shall be borne by USAID.

## **2) Selling of Mosquito Nets and Treatment Kits, and Management of the Revolving Fund**

By selling the supplied mosquito nets and insecticide kits and using the resulting funds to purchase new mosquito nets and insecticide kits, the Project aims to build a sustainable malaria countermeasures system. The following organizations and individuals shall play the following roles in the sale of mosquito nets and insecticide kits (see Figure 3).

- **Integrated Malaria Initiative offices (IMI):** The IMI in each area shall manage and supervise the overall collection and distribution of material supplies such as mosquito nets and insecticide kits, and shall also be responsible for transporting such items to the health centers (RHC).
- **District health management team (DHMT):** The DHMT shall manage and supervise the health centers, which will be the core facilities in the sale of mosquito nets, and they shall also bear part of the responsibility for transporting materials to the health centers.
- **Rural health centers (RHC):** As the core facilities for carrying out the actual sale of mosquito nets, the RHC shall store and manage mosquito nets and insecticide re-treatment kits, distribute mosquito nets to consigned sellers, and managed funds obtained from sales. The RHC shall also carry out direct sales to residents.
- **Neighborhood health committee (NHC):** The NHC are resident organizations having the objective of working with the RHC in improving local health conditions. The NHC shall appoint and offer guidance to consigned sellers.
- **Consigned sellers:** Appointed by the NHC, consigned sellers shall distribute mosquito nets throughout their immediate districts. They shall also offer guidance on the proper usage of mosquito nets and insecticide kits.

The sale of mosquito nets and insecticide kits in communities shall be carried out based around the RHC under the supervision of each IMI and DHMT. The mosquito nets and insecticide kits sent from the central administration shall first be stored in each IMI and then transported to the RHC. The mosquito nets and insecticide kits sent to each RHC shall be

consigned to sellers appointed by the NHC and sold to residents in the communities. The RHC shall also carry out direct selling without using consigned sellers. Sales returns shall be managed by the RHC and, following the deduction of commissions for sellers and the NHC, shall be deposited in bank accounts as funds for the purchase of additional mosquito nets and insecticide kits. Moreover, in order to counter the effects of inflation, accounts shall be held in US dollars and controlled in bank account ledgers.

Sales shall only be performed in cash, and barter trading as a rule shall not be accepted. In order to minimize non-payment, each seller shall be given 10 mosquito nets for each sales trip and shall only be given the next 10 when he deposits turnover from all the first 10 with the RHC. Moreover, in order to manage sales, four receipts of sale shall be made when each mosquito net is sold: one each shall be held by the buyer and the seller, and the remaining two shall be presented to the RHC and IMI.

When sales returns are deposited with the RHC, 5% will be paid to the seller as commission. Regarding the NHC, 5% of returns from total sales made by NHC sellers shall be paid en masse at the start of each month. Concerning direct sales from the RHC to residents, 10% shall be paid to the NHC as commission and used to finance local health activities under the guidance of the RHC.

When RHC stores are exhausted, RHC staff shall contact the DHMT, which shall apply to the IMI for further supply. When the supplied mosquito nets run out, funds shall be withdrawn from the bank account and used to purchase additional nets via the SFH. As a measure to prevent illicit withdrawals, the signatures of the persons in charge at the RHC, NHC and IMI shall be required. These procedures have been compiled into a manual and are taught to RHC staff, etc. in training.

In Kitwe district, where the Project targets urban areas, in addition to selling via the health sector based around health centers, it is planned to utilize stores (kiosks, supermarkets, etc.) as sales points in order to maximize the efficiency of distribution. It is currently planned for 70% of sales to be conducted through the commercial route and 30% through the health sector route. In the case of sales via the commercial route, distribution of mosquito nets and insecticide kits is performed in direct transactions with the IMI and the commission charge is set at 20% of the sale revenue.

It cannot be denied that the setup for selling mosquito nets, etc. as described above will enable wealthy households to own nets but may make it difficult for low income households to benefit. Therefore, initial sales conditions shall be analyzed and if sales are not going smoothly, consideration shall be given to the low price sale or even free distribution of mosquito nets to households containing infants under five or pregnant women, i.e. the groups originally targeted.

It is possible to check conditions of sale of mosquito nets and insecticide re-treatment kits and the situation concerning the management and operation of revolving funds by

monitoring various records. Moreover, it is scheduled for the NMCC to present a full report to the JICA Office and the Japanese Embassy every quarter.

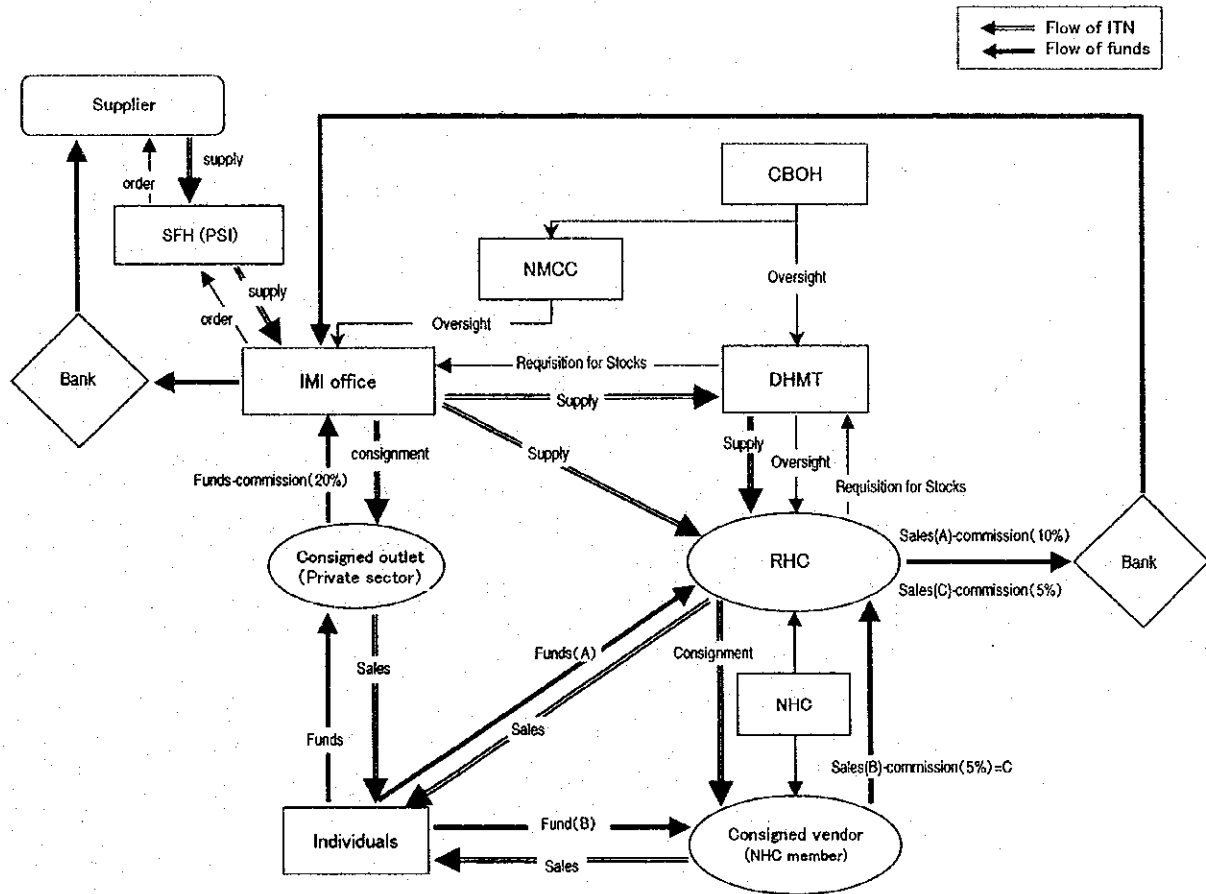


Fig. 3. Diagrammatized social marketing system of ITN

## Chapter 4 Project Evaluation and Recommendation

### 4-1 Project Effect

The Project is an Integrated Malaria Initiative in accordance with the WHO World Malaria Countermeasures Strategy, and it mainly aims to prevent malaria infections through distributing insecticide-treated malaria nets and to reduce serious cases and fatalities through the provision of early diagnoses and appropriate treatment. Utilization of human resources (health workers) to support these activities and education of citizens, etc. are also important components of the Project. Therefore, from the viewpoint of strategy too, the Project is judged to possess sufficient content as an Integrated Malaria Initiative.

USAID views the Project as a model case for future malaria countermeasures and it has already confirmed the provision of \$ 2,500,000 per year to malaria countermeasures offices in each area over five years as well as the implementation of financial support to NGOs, etc. under its control. Much of this budget is devoted to vehicle fuel costs and personnel expenses, which will increase in line with the large scale of activities, and areas which cannot be borne by the Government of Zambia are also covered. Generally speaking, the implementation setup has been specifically planned down to detailed parts. The budget issue, which until now was the main problem blocking the implementation of malaria countermeasures, has been resolved as a result of this support from USAID. Moreover, since the cooperation of UNICEF can also be obtained, the Project is considered to be appropriate as a malaria countermeasure based on cooperation between the United States and Japan.

If the Project is implemented, monitoring and evaluation of morbidity and fatality rates, etc. will be carried out every quarter, thus enabling any problems to be extracted and improvements made. Concerning the 27 parameters that make up the other countermeasures, periodic evaluations shall be made with a view to confirming results and unearthing any points requiring improvement. With respect to the sale of mosquito nets, it is scheduled for performance to be monitored and reported to the JICA Office and the Japanese Embassy every quarter.

The Project will serve the basic human needs of 1,200,000 residents. Moreover, since more than half the people who contract malaria and are hospitalized or die as a result are infants under five, the Project complies with the ideals of health grant aid and is deemed suitable for implementation under the grant aid scheme of the Government of Japan.

### 4-2 Recommendation

The Project is the first Integrated Malaria Initiative undertaking to be carried out based on cooperation between Japan and the United States. By utilizing the aid scheme characteristics of both countries, it is possible the Project will become a model for future malaria countermeasures. However, the following issues have been recognized in the site survey and it is considered that resolution of these will enable a bigger impact to be had with



respect to malaria, which is the most important public health issue in Zambia today.

#### 1) Sale of Mosquito Nets

The main component of the Project is the distribution of insecticide-treated mosquito nets. With respect to actual operation, it is intended to utilize social marketing techniques in order to raise awareness of malaria prevention among residents in epidemic-prone areas and to build sustainable malaria countermeasures. Moreover, from the viewpoint of realizing sustainable malaria countermeasures, it is scheduled for returns from the sale of mosquito nets to be put into a revolving fund for the purchase of new mosquito nets and insecticide in future. Consequently, selling mosquito nets is considered to be not only a means of raising awareness of net usage among residents, but also an important factor in supporting sustainable malaria countermeasures.

The trial sale of mosquito nets, targeting a subject population of approximately 60,000 in districts under the supervision of two rural health centers in each district of Eastern State, was started in September 1998. However, since only around 1,500 mosquito nets have been sold in the first two months of this trial, sufficient information has not yet been obtained to carry out appropriate price setting, etc.

The purchasing power of residents in areas at risk from malaria is low and this has been accentuated by the fact that harvests of corn (the main crop) have been poor in recent years. If the price of mosquito nets is set disproportionately higher than the purchasing power of residents, the situation may arise whereby only wealthy households possess mosquito nets and the distribution of nets is delayed. If the distribution of mosquito nets is delayed, insecticide applied to nets will cease to be effective and it will be difficult to implement concentrated distribution over the short term which is necessary to counter malaria effectively.

Therefore, the setting of an appropriate sale price is vitally important. It will be necessary to examine the sale price and distribution system upon giving full consideration to the results obtained from the current pilot plan. Furthermore, since characteristics of malaria and purchasing power differ according to district, it will be necessary to adopt a flexible approach consistent with conditions in each district. In order to realize the maximum malaria countermeasure effect from the distribution of mosquito nets, it is required that the Government of Zambia compile a plan which enables nets to be quickly distributed to the target groups.

#### 2) Revolving Fund from Sale of Mosquito Nets

Concerning management of the revolving fund, it has been confirmed that training based on manuals has already been carried out in the pilot project and that monitoring of records, etc. is being regularly performed.

However, in the Project, the number of targeted rural health centers will be expanded from six to approximately 100, while in Kitwe district it is planned to include commercial stores

(supermarkets, kiosks, etc.) as well as health facilities in the sales network. Accordingly, it will be necessary to monitor whether or not the Project can be managed with the same precision as the pilot plan.

The revolving fund shall as a rule be used to purchase additional mosquito nets and insecticide. Since this fund shall not be controlled by a central government agency (Ministry of Health or National Malaria Countermeasures Center) but will basically be managed by communities under the supervision of the rural health centers, there is a good chance that requests to use funds for separate purposes that reflect community needs will arise.

In the Minutes of Meetings, it has been agreed that the revolving fund should basically be used to purchase additional mosquito nets and insecticide, and that the National Malaria Countermeasures Center in charge of the Project should give quarterly reports of fund retrieval, management and operating conditions to the Japanese Embassy or the JICA Office.

### 3) Sustainability of the Integrated Malaria Initiative

The Project aims to build a sustainable malaria countermeasures system through operation of a fund generated from the sale of mosquito nets. Since the SFH can obtain tax exemption for the customs clearance of mosquito nets and insecticide during the period of activity by USAID, it will be possible to operate the system using the same prices.

Mosquito nets are being distributed at a price of 10,000 ZK ( US \$ 5) in the pilot plan, and this is less than one-third the current price in Zambia. However, following completion of the Project period and withdrawal of the SFH, taxed products will have to be purchased at market prices and it will no longer be possible to maintain this price.

In all African countries including Zambia, a high rate of taxation is placed on mosquito nets and this hinders malaria countermeasure projects which involve the distribution of mosquito nets. From the viewpoint of sustainability following Project completion, it is necessary for the Government of Zambia to examine tax reduction measures and other steps to aid the cheap and stable supply of mosquito nets and insecticide.

### 4) National Malaria Countermeasures Center

The National Malaria Countermeasures Center, the implementing agency of the Project, became independent from the Tropical Diseases Research Center (TDRC) in 1999 and was given the responsibility of planning, implementing and evaluating national malaria countermeasure projects. The NMCC has experience concerning parasitological and entomological evaluations for malaria countermeasures. However, since conventional malaria countermeasures have centered around the indoor residual spraying of insecticides, it is thought that the NMCC does not possess sufficient experience of citizen-participation-type measures involving the distribution of mosquito nets.

There is no doubt that the focus of malaria countermeasures in future will shift to the

distribution of mosquito nets and, in order to sustain effective malaria countermeasures into the future, it will be important to support the activities of the NMCC.

In the Project, too, it has been decided to procure equipment for use in evaluation, monitoring, training, investigation, and research, etc.

#### 5) Dispatch of Experts

Being in accordance with the WHO World Strategy of Malaria Countermeasures and having USAID and UNICEF as cooperating partners, the Project is a major undertaking having the potential to impact malaria epidemics throughout all Zambia. It was confirmed during the study period that USAID regards the Project as a model case for the future malaria initiative and intends to secure sufficient budget measures for it.

Since the malaria countermeasures strategy of USAID is mainly based around the sale of mosquito nets via social marketing techniques, and the implementation of prevention and treatment enlightenment activities, etc., even if specialists in this field are involved in the Project, there are still no experts capable of giving recommendations to the Government of Zambia concerning malaria countermeasures overall.

Evaluation of the impact of the Project on malaria epidemics will be carried out by the NMCC, while support from USAID will largely be financial. Moreover, although it is planned for the American CDC (Center for Disease Control) to cooperate with Project evaluation, this will only consist of short-term studies on drug-resistant strains of malaria and so on, and it will not be possible to obtain cooperation for periodic fixed point monitoring which is important for evaluating the Project overall. Moreover, since staff and capacity levels in the NMCC are inadequate, it will be necessary to carry out transfer of technology to allow the appropriate evaluation of large undertakings such as the Project and carry out the future expansion of countermeasures to the whole country. In view of these points, it is deemed that dispatching long-term Japanese experts in malaria countermeasures would be highly significant in raising the Project effect. Moreover, the Zambian Ministry of Health, USAID, and the JICA Office are all requesting the dispatch of experts.

If the Project activities were simply limited to the supply of equipment, it is possible that Japan's presence could be overlooked despite the fact that the Project is a joint undertaking by Japan and the United States. For the sake of turning the numerous experiences and results that will no doubt be obtained from this internationally high profile Project to use as guidelines for future malaria countermeasures of the Government of Japan, the dispatch of experts is deemed to be a vitally important component.

## Appendices

### 1. Member List of the Survey Team

■ Leader	Ms. TADA Manami	JICA
■ Equipment Planner	Mr. NAKAMURA Masatoshi	JICS*
■ Procurement Planner	Mr. KUROSAWA Kazuhiro	JICS*

JICS\* : Japan International Cooperation System

### 2. Survey Schedule

	DATE		ASSIGNMENT		
			TADA	NAKAMURA	KUROSAWA
1	28-Oct	wed	Tokyo 11:00 (BA006) → London 15:30 --- London 21:15 (BA2053) →		
2	29-Oct	Thu	Lusaka 10:20, Meeting with JICA Lusaka office and Embassy of Japan		
3	30-Oct	Fri	Monitoring & Evaluation meeting		
4	31-Oct	Sat	Field Survey		
5	1-Nov	Sun	Internal Meeting		
6	2-Nov	Mon	District Action Planning Meeting, Site Survey		
7	3-Nov	Tue	Ditto		
8	4-Nov	Wed	Ditto		
9	5-Nov	Thu	Discussion on Minutes of Discussions with MOH		
10	6-Nov	Fri	Signing on Minutes of Discussions, Report to JICA and Embassy of Japan		
11	7-Nov	Sat	Lusaka 18:40 (BA2052) →	Supplementary Study	
12	8-Nov	Sun	London 05:55 --13:25 (BA005)	Supplementary Study	
13	9-Nov	Mon	Tokyo 09:10	Supplementary Study	
14	10-Nov	Tue		Supplementary Study	
15	11-Nov	Wed		Supplementary Study	
16	12-Nov	Thu		Supplementary Study	
17	13-Nov	Fri		Supplementary Study	
18	14-Nov	Sat		Supplementary Study	Lusaka 13:35 (KQ422) → Nairobi 19:00
19	15-Nov	Sun		Supplementary Study	Data Analysis
20	16-Nov	Mon		Supplementary Study	Survey on Local Suppliers
21	17-Nov	Tue		Supplementary Study	Survey on Local Suppliers
22	18-Nov	Wed		Report to JICA, Lusaka 14: (Z9200) → Harare 14:50	Nairobi 10:00 (KQ440) → Harare 11:55
23	19-Nov	Thu		Visiting WHO Regional Office	Survey on Local Suppliers
24	20-Nov	Fri		Data Collection	Survey on Local Suppliers
25	21-Nov	Sat		Harare (BA2052) 21:45 →	
26	22-Nov	Sun		→ London 05:55 --- London (BA005) 13:25 →	
27	11/23	月		Tokyo 09:10	

### 3. List of Parties Concerned in the Recipient Country

#### Embassy of Japan, JICA Lusaka office

Name	Position
Yoshihiro Nakamura	Ambassador
Kenji Endo	First Secretary
Hiroshi Kuroki	Second Secretary
Mitsuo Ishikawa	Resident Representative, JICA Lusaka office
Naoki Ando	JICA Lusaka office

#### Ministry of Health

K.M.Bulaya	Permanent Secretary
S.M.Mulonda	Deputy Permanent Secretary
Vincent Musowe	Director of Planning
Rory J.C.Nefdt	National Malaria Coordinator
Esther Mulenga	Donor Coordinator
Ben U. Chilwa	Chairman, CBoH
C. Puta	Deputy Director, TDRC
Grace Kahemya	Laboratory, CBoH
B.M.Sikateo	Monitoring/evaluation, CBoH

#### District

Freddy Masaninga	EPIMI Representative
D.Squarre	DHMT Director/Chipata
M.M.Yobe	DHMT Director/Chama
P.C.Mphande	DHMT Director/Lundazi
M.Mkandawire	DHMT Director/Kitwe
F.P.Kapanda	DHMT Director/Samfya

#### WHO

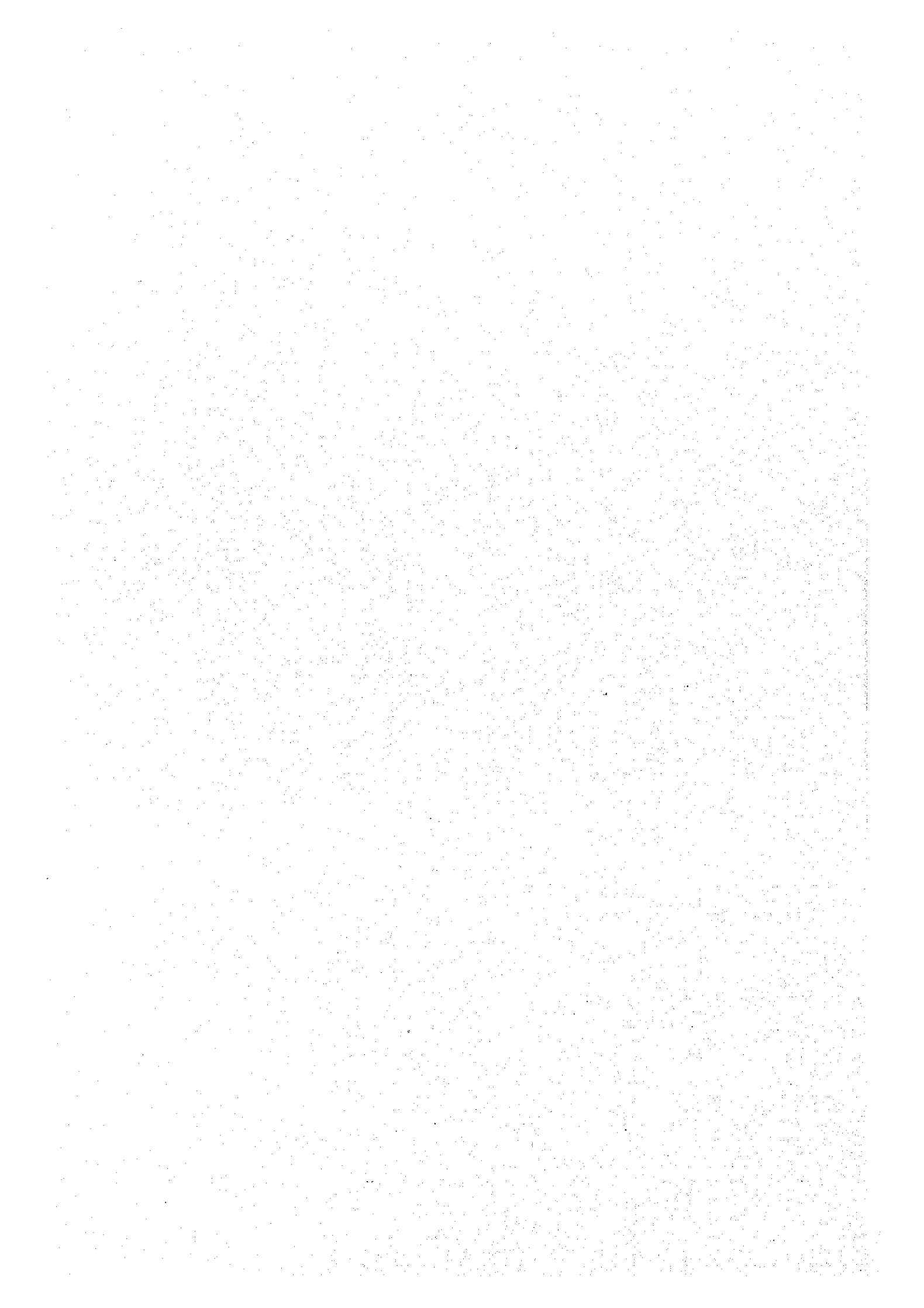
Birkinish Ameneshewa	WHO AFRO
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#### USAID

Paul Zaiz	USAID/Advisor, CBoH
Dennis Carroll	USAID/Headquarters/Malaria control
Bradford Lucas	SFH
Elizabeth Serlenrtsos	BASICS
Donald M.Thea	ARCH

#### UNICEF

Peter McDermott	Director, UNICEF Zambia
Zephaniah M.Mkumbwa	UNICEF Zambia
Christiane Rudert-Thorpe	UNICEF Zambia/ Luapula











JICA