THAILAND

Project Paper

for

Anti-Malaria Project

(#493-0305)

December, 1978

USAID/THAILAND

*****

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE) — PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: Thailand

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 493-0305

6. BUREAU/OFFICE: A. SYMBOL: Asia; B. CODE: 04

7. PROJECT TITLE (Maximum 40 characters): Anti-Malaria

8. ESTIMATED FY OF PROJECT COMPLETION: FY 82

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 79; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 79

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 = ฿20)

A. FUNDING SOURCE	FIRST FY 79 B. FX	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	4,500		4,500	4,500		4,500
(GRANT)	(500)	( )	(500)	(500)	( )	(500)
(LOAN)	(4,000)	( )	(4,000)	(4,000)	( )	(4,000)
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		8,300	8,300		28,000	28,000
OTHER DONOR(S)		285	285	1,000		1,000
TOTALS						

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 79 F. GRANT	G. LOAN	H. 2ND FY ___ I. GRANT	J. LOAN	K. 3RD FY ___ L. GRANT	M. LOAN
(1) PPH	B 514	542	542	500	4,000				
(2)									
(3)									
(4)									
TOTALS				500	4,000				

A. APPROPRIATION	N. 4TH FY ___ O. GRANT	P. LOAN	Q. 5TH FY ___ R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1) PPH					500	4,000
(2)						
(3)						
(4)						
TOTALS					500	4,000

12. IN-DEPTH EVALUATION SCHEDULED: MM 09 YY 80

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET. 2 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE:

TITLE: Mr. Donald D. Cohen, Director

DATE SIGNED: MM 04 DD 02 YY 79

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM 04 DD 02 YY 79

AID 1330-4 (3-78)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

To Be Completed By Originating Office

1. TRANSACTION CODE: C (A = Add, C = Change, D = Delete) — PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: Thailand

4. DOCUMENT REVISION NUMBER: 1

5. PROJECT NUMBER (7 digits): 493-0305

6. BUREAU/OFFICE: A. Symbol: ASIA; B. Code: 04

7. PROJECT TITLE (maximum 40 characters): Anti-Malaria

8. PROPOSED NEXT DOCUMENT: A. 3 (2 = PRP, 3 = PP); B. DATE: MM YY 01 79

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 79; b. FINAL FY 79

10. ESTIMATED COSTS ($000 or equivalent, $1 = ฿20)

FUNDING SOURCE	[illegible]
a. AID Appropriated	4,500
b. OTHER U.S. 1.	
b. OTHER U.S. 2.	
c. Host Country	28,000
d. Other Donor(s)	1,000
TOTAL	33,500

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE: C. Grant	D. Loan	E. FIRST FY 79: F. Grant	G. Loan	LIFE OF PROJECT: H. Grant	I. Loan
(1) PPH	B 514	542	542	500	4,000	500	4,000
(2)							
(3)							
(4)							
			TOTAL	500	4,000	500	4,000

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each): 510 | 511 | 521

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each): BR | R/H | TNG

14. SECONDARY PURPOSE CODE:

15. PROJECT GOAL (maximum 240 characters)

Improve the health status of the rural population as a major contribution to its social, physical and mental well-being.

16. PROJECT PURPOSE (maximum 480 characters)

Develop the institutional capability for providing to the rural inhabitants of Thailand's endemic malaria areas of high risk, continuing malaria control services for the foreseeable future at a level and quality sufficient to minimize the occurrence of the disease and to provide timely and proper treatment to those who do contract the disease.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds)

18. ORIGINATING OFFICE CLEARANCE

Signature:

Title: Mr. Donald D. Cohen, Director

Date Signed: MM 08 YY 79

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution: MM DD YY

AID 1330-2 (3-76)

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

To Be Completed By Originating Office

1. TRANSACTION CODE: [A] A = Add, C = Change, D = Delete — PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: Thailand

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 493-0305

6. BUREAU/OFFICE: A. Symbol: ASIA; B. Code: 04

7. PROJECT TITLE (maximum 40 characters): Malaria and Vector Control

8. PROPOSED NEXT DOCUMENT: A. [3] (2 = PRP, 3 = PP); B. DATE (MM YY): 11 78

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 79; b. FINAL FY 83

10. ESTIMATED COSTS ($000 or equivalent, $1 = 1)

FUNDING SOURCE	Life of Project
a. AID Appropriated	7,424
b. OTHER US 1	—
b. OTHER US 2	—
c. Host Country	60,611
d. Other Donor(s)	1,575
TOTAL	69,610

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. Grant	PRIMARY TECH. CODE D. Loan	E. FIRST FY 79 F. Grant	E. FIRST FY 79 G. Loan	LIFE OF PROJECT H. Grant	LIFE OF PROJECT I. Loan
(1) HE	514B	550	550	2,275	5,149	2,275	5,149
(2)							
(3)							
(4)							
TOTAL							

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each): 510 | 511 | 521

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each): BR | R/H | TNG

14. SECONDARY PURPOSE CODE:

15. PROJECT GOAL (maximum 240 characters):

Improve the health status of the rural population as a major contribution to its social, physical and mental well being.

16. PROJECT PURPOSE (maximum 480 characters):

Reduce the annual malaria parasite incidence in Thailand by 30% by 1982 along with reduction of annual mortality due to malaria by 50% during the same five-year period.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds):

TDY Program Documentation Development, 3 man-months, $35,000.

18. ORIGINATING OFFICE CLEARANCE

Signature:

Title: Director, USAID/Thailand

Date Signed (MM DD YY): 05 25 78

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution (MM DD YY):

AID 1330-2 (3-78)

THAILAND ANTI-MALARIA PROJECT PAPER

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GLOSSARY OF TERMS

Active Case Detection is a part of surveillance activities in which the formal malaria project actively searches for malaria cases through the collection of blood slides and epidemiological investigations.

AFRIMS - Armed Forces Research Institute of Medical Sciences.

Annual Parasite Incidence API is the proportion of cases of malaria detected on an annual basis in relation to the unit of population in which malaria occurs.

Biological Control is a method of controlling mosquitoes using living vertebrate or invertebrate predators, genetic control or parasites.

CDC - Division of Communicable Disease Control.

Chemoprophylaxis is drug prophylaxis which implies the use of drugs before infection with the aim of preventing disease.

DDT is an abbreviation of the common name dichlorodiphenyl trichloroethane, a chlorinated hydrocarbon type of residual insecticide.

Endemicity is a term applied to malaria when there is a constant measurable incidence both of cases and of natural transmission in an area over a succession of years.

Epidemic is a term applied to malaria when the incidence of cases in an area rises rapidly and markedly above its usual level.

Epidemiology in a broad sense is the study of the environmental, personal and other factors that determine the incidence of diseases.

Falciparum Malaria is a severe type of malaria caused by Plasmodium falciparum, a species of malaria parasite.

Focal Spraying is residual insecticide house spraying around a malaria focus.

Malaria focus is a defined and circumscribed locality situated in a currently or formerly malarious areas and containing continuous or intermittent malaria transmission.

Incidence is the number of cases of disease occurring during a given time period in relation to the unit of population in which they occur.

Larvicide is a substance used to kill the aquatic larval stage of the malaria mosquito by ingestion, contact or respiratory blockage.

Malaria Control is an operation aimed at reducing the prevalance of malaria to a level at which it is no longer a major public health problem.

Malaria Eradication is the ending of the transmission of malaria and the elimination of the reservoir of infected cases in a campaign limited in time and carried out to such a degree of perfection that when it comes to an end there is no resumption of transmission.

Malariogenic Potential is the degree to which an area is conducive to malaria based on cumulative epidemiological data collected from each area regarding the parasite load, vector density, water logging, climatic conditions, population movement and factors causing man made malaria.

Malathion is an organo phosphorus compound residual insecticide.

Malaria Parasite is a colloquial term for any of the protozoan organism causing malaria infections.

MOPH - Ministry of Public Health

Parasite rate is the percentage of persons showing malaria parasites by blood smear examination.

Passive case detection is a part of the surveillance activities in which the public health and medical services other than the regularly constituted malaria service, assist surveillance activities by searching for malaria cases by the collection of blood slides and epidemiological investigations.

Presumptive treatment is initial drug treatment given in a suspected malaria case at the time when a blood sample is taken for examination.

RTG - Royal Thai Government

Surveillance is that part of a malaria program aimed at the discovery, investigation and elimination of continuing transmission and the prevention and cure of infections.

Total spray coverage is the application of residual insecticide during one spraying cycle to all sprayable surfaces in all sprayable houses within a given operational area.

Ultra low volume (ULV) spraying is a method of insecticide dispersion by special air or ground equipment using very small amounts of finely dispersed particles of insecticide.

Vector in malaria is any species of mosquito in which the malaria parasite completes its sexual cycle in nature and which is thus able to transmit the disease.

Vector density is the number of female Anopheline mosquitoes in relation to the number of specified shelters or hosts or to a given time period specifying the method of collection.

Vector Susceptibility represents the degree to which a species of mosquito develops resistance to the effects of insecticides.

Water management involves the reduction or elimination of sources of mosquito breeding through filling, draining, diking, changes in water level, flushing, canal trimming and other engineering methods.

I. Summary and Recommendations

A. Face Sheet Data
(See preceding page)

B. Recommendations

Approval of the following:

- AID Grant $500,000
- AID Loan (Terms: 40 years including 10 years grace 2% during grace, 3% thereafter) 4,000,000
- TOTAL (Loan and Grant) $4,500,000
- Proprietary Procurement (See Part IVD for justification)
- (a) Hudson Sprayer Company for spray canisters and spare parts
- (b) Spray System Company for spray nozzles
- 636 I waiver for purchasing non-US origin motorcycles (See Section IV.D. for justification.)

C. Summary Description

The proposed $4,500,000 assistance package is intended to assist the Royal Thai Government in strengthening its institutional capability in providing malaria control measures for the 8,700,000 people residing in the high malaria transmission areas. The assistance will occur at the national, regional, zonal and sector levels; however, the primary emphasis of the project will be directed at interventions made at the first point of contact in the malaria control service delivery system in order to improve the extension of the services to rural residents. This project differs from the traditional approach to malaria in three major ways: it emphasizes the early identification and treatment of the malaria parasite in man; it is attempting to promote malaria control practices through the private sector; and, there is no major concentration on commodity importation - hence avoiding the risk of supplanting the existing procurement system already working in Thailand.

The project will assist in the development and support of 200 sector level clinics for diagnosis and treatment, development of 12,000 member community volunteer support system, as well as health education interventions designed and produced in the private sector.

In addition, support will be provided for training (both academic and technical), transportation, improving spraying efficiency and effectiveness, and research. The project will run for three years and will terminate at the same time as the Fourth Five Year Development Plan of Thailand as well as the Fourth Five Year Plan of Operations of the Malaria Division.

By making diagnosis and phamaceutical interventions more available in remote rural areas, the project will contribute toward the reduction of morbidity and mortality due to malaria in addition to expanding government service facilities, thus enabling the persons with malaria to have access to quality care. All of the interventions proposed for funding under the project will suppliment the services presently provided by the Malaria Division thus strengthening the present institutional system rather than supplanting on-going RTG efforts.

D. Summary Findings

The results of the technical and financial analysis prepared for this project indicate that the proposed interventions are technically sound and that the cost projections are realistic and reasonable. The economic, social and environmental analyses all indicate that significant benefit will accrue to the rural poor residents of Thailand and all germane considerations relating to these three important areas have been addressed and satisfactorily dealt with in this paper. No major issues remain.

This project meets all applicable statutory criteria as shown in Annex L attached hereto. The Mission Director has certified that Thailand has the capability to effectively maintain and utilize the project.

E. Project Issues

Questions raised in the AID Project Identification Document APAC review of July 14, 1978 and outlined in State 185721 (Annex A) are discussed below:

1. Project Scope - The bulk of malaria transmission in Thailand takes place in the control sectors (most of which are within 50 miles of the border) encompassing 8.7 million rural residents. Since the transportation system in the country is well developed, particularly within the non-border areas, the population at risk could be interpreted more widely, however, AID's relatively small incremental resource commitment can only have a significant long term impact if it is

Chart 1

Planned Contributions to Thailand Anti-Malaria Program, FY 1979-81

		($ millions)
AID		
	Grant	0.5
	Loan	4.0
WHO		0.7
Action (Peace Corps)		0.3
RTG		28.0
TOTAL		$33.5

Chart 2

Planned AID-Financing, Thailand Anti-Malaria Program, FY 1979-81

AID Financed Inputs		($ thousands)	
Grant:	Technical Assistance	230	
	Training	160	
	Evaluation	40	
	Miscellaneous	70	
			500
Loan:	Training	575	
	Construction	520	
	Commodities	885	
	Reimbursable Fund	320	
	Vehicle Overhauls	400	
	Miscellaneous	400	
	Other	700	
			4,000
TOTAL			4,500

concentrated on the highest risk areas which are projected to have a chronic malaria problem. Since these areas have already been identified and necessary operations within them begun, an effective program is feasible. The RTG's Malaria Division has succeeded in checking transmission for 80% of the population and this project is intended to supplement control efforts in the major problem areas: those areas containing 8.7 million rural residents.

2. RTG Commitment - The Royal Thai Government's budget for the Malaria Division is given in Annex F. Since the withdrawal of foreign donor financial assistance, excluding WHO assistance, the Malaria Division has managed to maintain control of the malaria situation in Thailand although working with limited funding. The commitment of the Malaria Division, as well as the Royal Thai Government, is reflected in the increased annual budgets for the past six years; and, there is little doubt in the minds of project planners that the Royal Thai Government will continue its commitment of fiscal resources to malaria control once AID project support is terminated. Further indication of RTG commitment is evidenced in the annual increase in operating budget called for during the project lifetime and other commitments discussed under Part IIB-2.

3. Vector Control Coordination - The broader approach included in the PID - Dengue Hemmoragic Fever and non-malarial vector control - has been narrowed to focus on the RTG's top priority: malaria. This decision is based on several considerations: Malaria is a disease affecting primarily the rural poor, DHF is mostly an urban problem, and a decrease in available AID money demands a more narrow approach. The reduction in the scope of activities has allowed for all logistical and administrative planning to be concentrated in one division, thus improving the likelihood of project success. In addition, monitoring the approaches funded in this project will consume a good deal of staff time and focusing project activities will allow for tighter management and hopefully more significant results. Part IIIA justifies the proposed approach in more detail.

4. Training - A complete training program and support information is included in the body of the Project Paper; however, the primary focus of this project is to draw upon the existing training facilities and programs of the MOPH, strenthen the capability of the Malaria Division's Training Division, and provide academic training for the future leadership of the Malaria Division. The project intends to draw upon personnel in control sectors with particular emphasis on those sectors also covered under the Rural Primary Health Care Expansion Loan (493-T-021) in an attempt to capitalize on an integrated approach to malaria control. As the initial efforts are successful, the approach will be expanded to other malaria sectors.

5. Research - The Project Paper emphasizes further development and institutionalization of the operational research capabilities of the RTG's Malaria Division. In addition, the project will formalize the relationship between the Armed Forces Research Insitute of Medical Science (AFRIMS) and the Ministry of Public Health's Malaria Division and will draw upon the resources of the AFRIMS facility to assist in the review and coordination of research efforts funded through this project. In addition, the World Health Organization is sponsoring training in malaria and vector control research procedures and protocols thus further unifying the in-country research oriented activities. A listing of possible research activities is given in Annex G; however, the list is more useful as an illustration, as specific operational research activitiies are difficult to identify prior to the implementation of the actual program funded under this project.

6. Anti-Malaria Drugs - Several operational research proposals are under consideration to study the resistance problem.

7. Vehicles - A vehicle maintenance program is an integral part of the project paper. The project will not only fund major overhauls, and vehicle maintenance training, but will also supply parts in order to prolong the working life of the Malaria Division's vehicular fleet - 95% of which is U.S. origin. Annex G has tables indicating the current status of the fleet.

8. Environmental Assessment - An environmental assessment has been completed and is submitted as a separate document.

9. Monitoring

Current AID Mission staffing ceilings preclude the assignment of a direct-hire fulltime malaria advisor in Thailand at this time. The project will finance two local-hire, full time contract field monitors who will be paid under the grant and responsible to AID. They will have appropriate academic and practical training in malaria control, speak Thai, and have experience in the Thai malaria control program. In addition to these monitors, alternative arrangements for a technically qualified advisor are discussed in Annex G.

10. Project Preparation - Project preparation has been hindered by the lack of coordinated arrivals for project paper team members. The AID Mission would like to encourage that these problems be avoided if possible in the future. Staggered arrivals when not planned for, not only prevent the development of a team concept in project design, but also draw very heavily on the valuable staff time of the Royal Thai Government personnel involved in the development activity.

11. Project Evaluations - See Part IV E for the evaluation plan. The suggestion to examine provisions for maintenance of a strong program after project termination is well taken. The original five year project life proposed in the PID has been reduced to three years in order to conform with the RTG planning schedule thus insuring that ideas and techniques developed and tested during the project period will be considered for the next five year malaria plan of operations commencing in 1982. Project evaluations will cover progress toward a strong on-going program.

12. Split RTG Responsibilities for Grants and Loans - At the present time grant and loan projects are administered by two different organizations (DTEC and NESDB). This project agreement will be signed by the Ministry of Finance as representative of the RTG and both of the implementing agencies, and it will reflect the close cooperative spirit called for in the implementation of this project.

13. Project Amounts - Funding for this project has been rounded to manageable figures, and project staff apologizes for any inconvenience caused by PID figures.

F. Project Development Committee

1. USAID Project Committee

Henry D. Merrill,	Office of Health Population and Nutrition, Chairman
John A. Tennant,	Office of Project Development and Support, Deputy Chairman
Surindr Satchakul,	Office of Health Population and Nutrition
Richard Albores,	Office of Finance
William D. Flemming,	Office of Program Planning and Evaluation
John Kahle,	Regional Legal Advisor
Kanda Suraskulwat,	Office of Health Population and Nutrition
Vilai Chitravimol,	Office of Project Development and Support

2. Royal Thai Government Project Development Committee

Dr. Manasvi Unhanand,	Director General Department of Communicable Disease Control, Chairman
Dr. Suwan Wongsarojana,	Director, Malaria Division Dept. of CDC
Dr. Somthas Malikul,	Chief of Epidemiology Section, Malaria Division
Dr. Surin Pinichpongse,	Regional Director Malaria Region 1
Dr. Udom Chitpraroo,	Regional Director Malaria Region 2
Dr. Prida Kocharatana,	Regional Director Malaria Region 3

Dr. Thawati Keosanit	Regional Director Malaria Region 4
Dr. Chaiya Poolthong	Regional Director Malaria Region 5
Ms. Suphawan Amaranga	Secretary to Dr. Suwan Wongsarojana, Director of Malaria Division
Ms. Chanathip Posayanon	Office of Financial Economics Ministry of Finance
Mr. Som Wanprapa	NESDB
Mr. Kittipan Kanjana-pipatkul	Chief, AID Program DTEC
Mr. Pichet Sunthorn-pipit	Chief, Technical Division DTEC
Mr. Poonsap Piya-anan	BOB

3. WHO Malaria Consultants to Thailand

Dr. Peter F. Beales	Senior Malariologist
Dr. I.A.H. Ismail	Entomologist
Mr. I.B. Windia	Sanitarian

4. Armed Forces Research Institute of Medical Science

Dr. Herbert E. Segal	Director
Dr. Bruce Harrison	Assistant Director

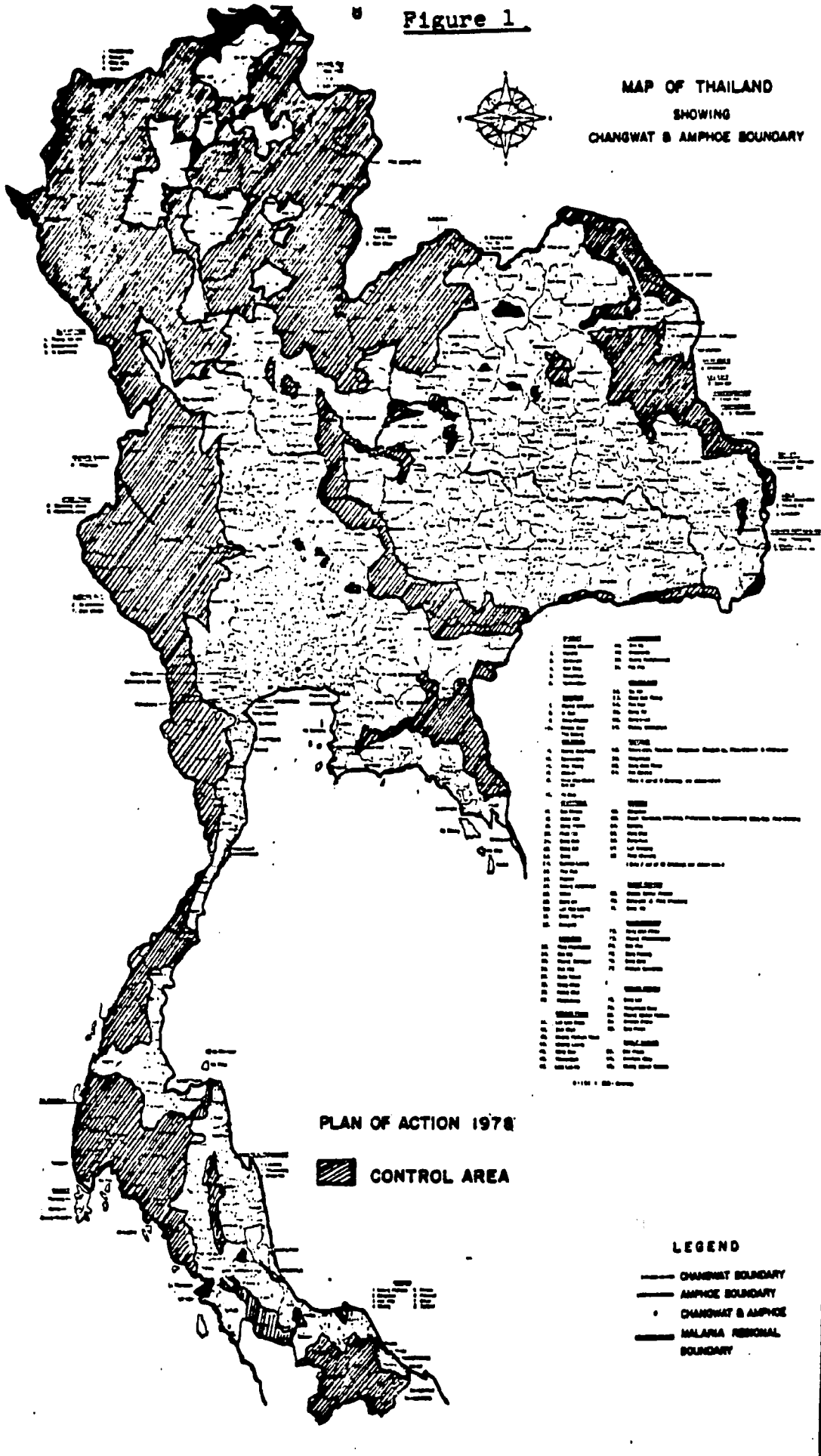
5. Peace Corps

Mr. James Hopkins	PCV
Mr. Richard Kalina	PCV

6. Consultants

Mr. Larry Cowper	Asia Malaria Advisor
Dr. Eugene Gerberg	Environmental Analysis Consultant
Dr. Jay Graham	Environmental Analysis Consultant
Mr. Richard Shaw	Entomology Consultant
Mr. John Stivers	Vector Control Consultant

Figure 1


MAP OF THAILAND
SHOWING
CHANGWAT & AMPHOE BOUNDARY
PLAN OF ACTION 1978
CONTROL AREA
LEGEND
CHANGWAT BOUNDARY
AMPHOE BOUNDARY
CHANGWAT & AMPHOE
MALARIA REGIONAL
BOUNDARY

II. PROJECT BACKGROUND AND DESCRIPTION

A. Background

1. Introduction

Malaria has been an important disease in Thailand for centuries. Recent figures show that more than 315,000 persons contracted malaria in 1977.* The size of the country, the variety of geographic and demographic conditions and mobility of the population contribute to the enormous problem. The effect of malaria is recognized as a deterrent to economic development. Details of the demographic and geographic aspects of Thailand are available in numerous reports and are not reported in this project paper, however, Figure 1 shows the approximate extent of the areas where control efforts are expected to be required indefinitely.

In 1949 malaria was the leading cause of death with over 38,000 reported deaths due to malaria or 201.5 deaths per 100,000 population. Following the encouraging results in 1950 of the RTG/WHO/UNICEF Pilot Project for malaria control with DDT residual house spraying in Chiang Mai Province the Government with AID assistance developed a country-wide malaria control program in 1951. By 1957 the program covered a population of 12 million and active case detection was started in some areas. After a joint RTG/WHO/AID assessment in 1963 a malaria eradication program was started in 1965 and the first plan of operations was signed by the RTG and WHO. In 1968 AID withdrew its regional malaria advisors, and later gradually completed the withdrawal of all malaria control assistance which was given in the form of insecticide (DDT), transport, fellowships and materials. Only the supplies and transport left over from previous commitments were received in 1970. This same year the malaria death rate was reduced to 10.1/100,000 population, the lowest level ever since. The joint fund budget (counterpart funds) had to be abolished in 1971 and provisions made in the regular budget of the National Malaria Program.

In 1971 a new policy was developed as a result of the WHO revised global strategy of malaria eradication. The new strategy aimed at maintaining the gains already made and preventing new problem areas. The plan of operations was revised and implemented for the period 1971-1976.

*1978 figures are: 356,153

This plan was designed to meet the costs of the project in the face of the budget reductions, by developing local criteria, adjusting program phasing, and commencing integration into the basic health service starting with 7.8 million population in 1971. Following the withdrawal of AID support, however, the program experienced great difficulties in funding, and many previous gains were weakened or lost.

The last independent external assessment was carried out in 1974 by a joint RTG, USAID, WHO Team. This was followed by a country health planning exercise in 1975 during which malaria was identified as a priority problem, and a malaria and vector control program was formulated in that year.

WHO has continued to support the program with advisors, some supplies and equipment and fellowships. UNICEF provided assistance for training health workers in malaria from 1971 to 1976. Peace Corps volunteers continue to be provided to assist in laboratory and field operations.

The latest plan of Operations signed by RTG and WHO covers the period from 1977 to 1981 and has for its goal eventual eradication of malaria in most of the country containing a population in 1978 of 33 million, but with long range control activities in the high risk mountainous and international border areas with a 1978 population of 8.7 million.

2. Malaria Endemicity

The data on malaria case incidence detected by the program's surveillance system is summarized in Table 1:

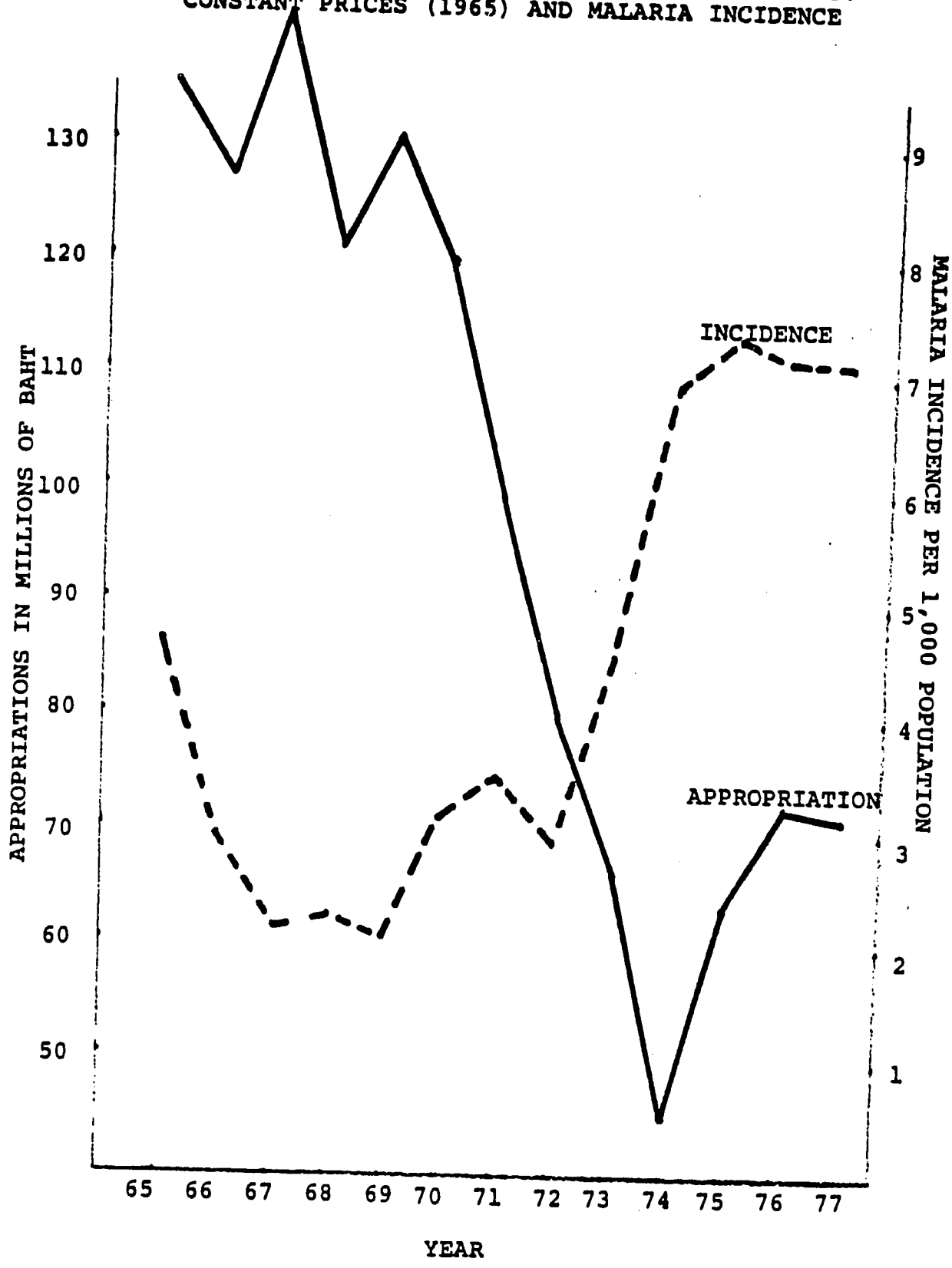
Table 1: Malaria Incidence 1965-1977

Year	Population Covered	%Total Pop. Covered	Slides Examined	Number of Positives	SR % (*)	ABER % (*)	API % (*)
1965	15,800,415	52.6	2,025,061	83,438	4.12	12.80	5.28
1966	21,247,199	68.1	2,539,626	64,101	2.52	11.95	3.02
1967	27,003,308	83.9	3,328,812	56,701	1.70	12.33	2.10
1968	31,111,614	93.7	4,001,222	66,971	1,67	12.86	2.15
1969	32,493,440	95.3	4,669,289	63,721	1.36	14.37	1.96
1970	30,504,865	96.6	3,971,997	85,763	2.16	13.02	2.81
1971	31,620,411	96.9	3,849,131	109,352	2.84	12.17	3.46
1972	30,728,561	91.24	3,311,759	89,759	2.71	10.78	2.92
1973	32,827,148	93.2	3,430,889	144,855	4.22	10.45	4.41
1974	34,479,724	94.2	3,608,342	238,950	6.62	10.47	6.93
1975	36,013,664	94.9	3,589,238	267,534	7.45	9.97	7.43
1976	39,743,090	100	3,600,475	287,547	7.99	9.06	7.24
1977	40,947,698	100	3,973,513	315,431	7.9	7.9	7.7

* SR: Slide Positivity Rate
ABER: Annual Blood Examination Rate
API: Annual Parasite Incidence

Figure 2

A COMPARISON OF MALARIA PROJECT APPROPRIATIONS: CONSTANT PRICES (1965) AND MALARIA INCIDENCE



Based on the Slide Positivity Rate (SPR) and the Annual Parasite Incidence (API) from the above table it is clear that the incidence of malaria since 1972 is increasing at an alarming rate even with relatively good coverage of the population as shown by the Annual Blood Examination Rate (ABER). The table also points out that during the years from 1966 to 1970 when there was maximum financial support the malaria rates stayed at low levels. Figure 2 shows the relationship between funding and malaria incidence more dramatically.

B. Project Description

1. Strategy

As described in this PP's technical analysis, various constraints in health education, training, laboratory and clinical services, transport, and support services currently do not permit a level and quality of malaria control operations sufficient to prevent the continuing rise in the number of malaria cases in Thailand.

This project will provide assistance aimed at developing the capability of the Division of Malaria Control to provide and maintain adequate malaria control services in Thailand's endemic malaria areas of high risk. It will concentrate on relieving key constraints to control activities in these priority areas, which have a total population of more than 8 million predominantly poor rural people.

It is the intention of the AID supported malaria effort in Thailand that the funding be used to:

- develop and strengthen the institutional capability of the RTG's Malaria Division in order to enable it to better meet the demands of malaria control in the country;

- enable the RTG's Malaria Division to test new approaches to malaria control so that they can be incorporated in the next five year plan of operations of both the Malaria Division and WHO;

- support new activities of the RTG anti-malaria effort and not supplant existing ongoing efforts.

The project implementation period has been shortened to 3 years from the 5 years estimated in the PID. The

proposed 3 year project period will more closely conform to the existing RTG/WHO "Malaria and Vector Control Program 1977-1981" and to the RTG's Fourth Five Year National Development Plan which runs from 1977-1981. (See Annexes D and E for a summary of the Program and Plan of Operations). It will also allow for a thorough evaluation prior to the Fifth Plan commencement. This will facilitate possible follow-on activities and any needed strategy revisions in conjunction with the beginning of the next program and Fifth Plan. Due to the shorter implementation period and the reduced AID input of $4.5 million compared to the PID estimate of $7.5 million, and after an assessment of feasibilities, the PID project purpose was also redefined. The purpose discussed herein provides more specific and realistic targets for the project (see Annex B Logical Framework) in view of the above considerations.

During the development of this project care was taken to select cost effective project interventions which will have long-term benefits for malaria control but which also will provide the maximum number of immediate benefits to the rural poor. Direct support for items financed on an annual basis was not considered an appropriate intervention since such support would not have a true developmental impact.

Although this project provides support directed at major constraints in several priority areas, the major thrust of the AID-financed institutional development interventions is toward establishing a strong outreach capability within the Malaria Division, so that malaria can be attacked through chemo-therapy while the parasite is present within the human host. The expansion of the malaria clinic coverage along with the required training and equipment, strengthening the community volunteer infrastructure, relieving the sector malaria workers' transportation constraints, and improving health education activities are all directed toward establishing an improved outreach capability. This approach was chosen because of increasing difficulties with the traditional vector control approach (changes in vector behavior, increasing vector tolerance to DDT, high spray refusal rates, etc. as detailed in the Technical Analysis), and because initial experiences with conveniently located malaria clinics in 50 control areas indicate that on-the-spot case detection and radical treatment is both an effective and efficient malaria control device that is very well received by the local population.

Other areas of assistance include financing priority research and improving research capabilities, requiring increased annual budget allocations for operations, improving training facilities and financing certain training activities, and procuring certain commodities and technical assistance which will facilitate institutional development. These interventions are described in more detail under Part B.4, Detailed Description.

The above strategy deviates somewhat from the PID in that AID financed interventions are more selectively targetted on institution building within the Division of Malaria Control.

During intensive review it was determined that DDT procurement was not a major constraint and it was accordingly been eliminated from this proposal. The project as currently designed does not include a strong operational vector control component, or include integration of malaria operations into the public health service. Integration of health services is a component of the RTG program; however, due to the potentially explosive nature of the disease of malaria, and considering the poor results worldwide from previous attempts with integration, the RTG is not eager to experiment with administrative structures at this point in control activities. There is no question, however, that the RTG and the MOPH want to utilize all possible personnel in the fight against the disease, and partial integration activities directed at the most effective use of manpower are included in the Plan of Operations. (see Analyses Section for justification of these deviations).

The proposed strategy does not mean that less attention will be given to vector control or anti-malaria activities in lower risk areas of the country, or that spraying will be de-emphasized because AID will not be involved in procurement of DDT. These activities will continue in accordance with the approved Plan of Operations signed in early 1978 by the RTG and WHO, which AID fully supports. Further, this project's interventions in equipment procurement, training and research will complement the WHO/RTG program and benefit the entire malaria control operation. Resource limitations, RTG priority concerns, and a consideration of the most critical constraints to the approved Plan of Operations were the primary factors which resulted in the selection of the AID financed project interventions described herein.

2. RTG Commitment

Since 1965 anti-malaria measures have essentially eliminated malaria in areas where 80% of the population live, and a good deal of effort and expenditure is required every year to simply maintain the gains already achieved under the program. The total malaria control budget has been increasing by almost 10 percent annually since 1976 and currently (FY 1979) provides about $8.5 million for malaria control, which is about 5% of the total budget for the Ministry of Public Health.

As an additional demonstration of commitment in conjunction with the AID financed project it is planned that the RTG will do its part in upgrading the Malaria Division institutional capability for providing adequate services to priority areas. The following five specific RTG inputs are planned in support of the project:

a. A substantial increase for the Malaria Division's operating budget (includes budget line items for Miscellaneous Expenses and Supplies excluding amounts for rents and DDT) which is agreed to be adequate to cover expenses associated with effective program operation i.e. sufficient to cover recurring costs and to provide funding for program expansion if necessary. Specifically, these costs might include: transport and per diem to local workers supervising community malaria volunteers and other operational costs, increased drug purchases needed for the expanded clinic network, and purchase of other supplies required to support the project.

b. Fill existing professional staff vacancies. There are currently 46 technical-professional staff vacancies within the Malaria Division which should be filled by 1982.

c. Purchase a minimum of 15 motor vehicles annually. At least 45 new vehicles are needed by 1982 to meet minimum transport needs, in addition to the provision made to overhaul existing vehicles under this project.

d. Provide travel subsidy for malaria workers with private motorcycles of not less than 50 satang/kilometer.

e. Waive all customs duties and other fees on all imported commodities financed under the loan, or alternatively to provide additional funds for paying duties and fees.

3. Conformance with AID Objectives

Effective malaria control has a beneficial impact on projects being carried out and proposed in all of AID's priority sectors, since malaria strikes hardest at the poor in rural areas. The proposed project will thus support

AID's rural oriented stategy in Thailand as well as protect the sizeable investment that AID has already made in rural areas.

The project conforms closely with the recommendations made in the November 1977 Asia Bureau Strategy Study and meets criteria for support as described in AIDTO CIRCULAR A-733 dated July 3, 1973. Following these recommendations, the project represents a selective support effort of the approved RTG/WHO Malaria Plan of Operations and concentrates on controlling malaria in areas which have the highest level of malaria endemicity. It is linked to the provision of an adequate malaria budget and staffing.

Successful implementation of the AID project should greatly contribute to improving the quality of life in rural areas and facilitate the capacity of rural people to participate in the development process.

4. Detailed Project Description

Annex B is the logical framework for this project. The narrative description follows below:

a. Goals

The broad sector goal to which this project contributes is the improvement of the overall health of the population in Thailand. Since malaria is one of the most prevalent diseases in Thailand, with more than 315,000 cases recorded in 1977, the control of this disease would be an important step toward the sector goal. In addition to the proposed malaria project, AID has ongoing projects in rural primary health care and in population planning which also are targetted on improving the health of Thailand's population, particularly in rural areas.

The project sub-goal is to maintain long-term control of malaria in the border and mountainous areas where malaria is highly endemic and all but impossible to eradicate; and, to eradicate the disease in all remaining areas of the country. This sub-goal is the program objective of the RTG's ongoing Malaria and Vector Control Program 1977-1981 (See Annex D). Unfortunately, due to funding and other problems described herein, the RTG program objective is not

likely to be met by 1981. The proposed AID-financed project will relieve many of the major constraints of the ongoing program, and thus contribute to the attainment of the sub-goal during subsequent years. The measures of sub-goal achievement are from the RTG's Malaria and Vector Control Program and are indicators of decreased morbidity and mortality:

- to eradicate malaria in eradication areas and to prevent major outbreaks in control areas.

- to reduce malaria mortality by 50% to approximately 5 per 100,000 population.

During the course of this project little or no decrease is expected in the malaria incidence figures. Since case detection capabilities will be strengthened under the project, official RTG incidence figures may actually increase. Over the next several years, however, provided malaria control activities progress as expected, both morbidity (in real terms) and mortality from malaria should substantially decrease, in accordance with the sub-goal targets.

An important assumption for malaria control and continued health improvement is that the insurgency situation in Thailand will not worsen significantly. A marked increase in insurgency would interfere with most malaria control operations in affected areas. At present, less than 1% of the rural population appears to be in insecure areas which cannot be visited by malaria control workers. These places are mostly along the borders of the country and are part of Thailand's highly endemic malaria areas. In some of these insecure areas military hospitals provide relief to malaria patients from the the local population. In recent months the Government has moved large numbers of people out of these insecure areas into more stable areas. The insecure areas have not substantially increased during the recent past, according to regional malaria officials. They also state that no significant increase in the intensity of insurgency is expected to occur in the foreseeable future which would adversely affect malaria control activities.

b. Project Purpose

The purpose of this project is to develop the institutional capability for providing to the rural inhabitants of Thailand's endemic malaria areas of high risk, continuing malaria control services for the foreseeable future at a level and quality sufficient to minimize the occurrence of the disease and to provide timely and proper treatment to those who do contract the disease.

Because the purpose is to develop the institutional capability for providing services, and not to provide the services directly, the AID project does not finance such items as DDT, drugs, or other recurrent expenses. Rather, it emphasizes improvements in training, health education, and case detection and treatment. The project will facilitate decentralization of malaria control and improve follow-up, supervision, and community participation wherever practical.

Innovations such as follow-up training for community level malaria volunteers, an arrangement for a revolving fund for purchasing motorcycles, and priority research efforts are included on a pilot basis under the project in an effort to provide risk capital for high potential return interventions. AID and the RTG expect that successful and cost effective innovations will be replicated on a larger scale during the next Malaria Program period (1982-1986).

This project's institutional development effort will be focused on the MOPH's Malaria Division. The project design team determined that a precipitous transfer of malaria control functions and authority to the basic health infrastructure was not appropriate; a gradual approach emphasizing proper planning and training seemed more prudent. This project's approach is accordingly to facilitate a partial integration approach described in the PP's Administrative Analysis, and provide for a detailed implementation plan for an appropriate level of integration at a later date.

Indicators of the end of project status include indirect indicators of institutional development as well as the operational results of such development. Indicators include adequate staffing, funding, facilities, transportation and equipment for fulfilling approved plans of action, and an ongoing research program targetted on priority problem areas, a 50% increase in the number of persons receiving immediate diagnosis and treatment at sector clinics, and a decline in the mortality rate of malaria below 9 per 100,000 - which represents the lowest level it has ever been. Other indicators

are provision for an adequate long range malaria control program in the Fifth National Development Plan (1982-1986), and indicators of success in partially integrating the health and malaria services.

Major assumptions for achievement of the project purpose include timely RTG approval of staffing and funding needs, continued health service cooperation for partial integration, and acceptance by local people of proposed interventions. AID believes these assumptions are valid.

c. Outputs

(1) Operating Malaria Clinics in Strategic Locations Within Priority Malaria Control Areas:

At the present time, 1978, the Malaria Division has 242 sectors with at least some part of their areas classified as control. Approximately 200 sectors have fairly extensive control areas. In 50 of these sectors the Malaria Division has already established clinics that provide walk-in malaria identification and treatment services. The success of these facilities is significant in that they, on the average, identify 75% of all malaria cases detected in the sectors where they are located. They significantly reduce the backlog of slides that are examined at the Zone laboratories, and enable immediate diagnosis and treatment of malaria, rather than the usual two week to two month delay. The project will supply microscopes for a minimum of 150 priority sectors that do not presently have identification and treatment centers in addition to sponsoring the training for the microscopists. Assistance will cover expenses for training additional persons and providing additional equipment. Two or more microscopists with microscopes may be provided in some sectors with a serious transmission problem. In addition, a field monitor will be funded under the technical assistance component of the grant in order to monitor and assist the sector based effort.

AID Mission staff and technical experts familiar with the Thailand malaria program agree that early identification and treatment will decrease the parasite reservoir in man thus reducing morbidity due to malaria; however, the initial statistical result in the field will most probably indicate an increase in morbidity as better service will be available in the field. Thus persons who had previously obtained care from private sources such as drugstores, and were not reflected

in statistical information, will begin obtaining treatment in government facilities. Obviously there will also be a significant decrease in mortality as appropriate treatment will be given to more persons on a faster basis.

The need for further exploration and development of control methods is particularly important in Thailand due to the population's resistance to spraying in some areas coupled with the preliminary identification of a possible change in biting habits of the vectors A. Balabacensis & A. Minimus. In addition, presumptive treatment although rendering persons asymptomatic does not always stop the transmission cycle. If one were sure of the kind of malaria being dealt with at the point of contact then appropriate treatment could be given on the spot. The proposed approach will also eliminate some of the need for costly follow-up activities, and might also decrease the need for extensive slide cross checking (except to verify accuracy) since all areas where these clinics are located will be in control rather than eradication areas.

(2) Improved Health Education Program:

Health education is a necessary component of health intervention programs; however, often the exact formulation of the education effort is not clearly defined. In Thailand, the anti-malaria program has a public educational component but its effectiveness suffers from poor equipment and outdated software. In addition, there is doubt that adequate expertise could be developed and sustained over a long period of time within the Malaria Division that could support production of relevant and effective public information software. Under this project; therefore, it is proposed that expertise in software production be sought outside of the Ministry of Public Health. Thailand has a very sophisticated marketing system that has been proven effective in marketing consumer products in very remote areas, and it is proposed that this expertise be brought to bear on health education related to malaria control. The services purchased would include not only software production, but also the development of approaches to selling malaria care and prevention to the residents of the control areas.

In conjunction with the development of an adequate health education program and materials. The Malaria Division requires additional hardware and equipment which will

be provided under this project. A tentative list of equipment is given in Annex F.

(3) Improved Operational Capability of Field Workers:

Four areas have been identified that will lead to better operational capability within the malaria effort:

-- Sprayers and spray parts - The Malaria Division has been having some problems with effective spray coverage in recent years. Coverage varies from 30% to 90% throughout the country with no area receiving 100% coverage due to either inaccessibility to the living quarters or entry refusal. Entry refusal reasons are complex; however, the major complaint centers around discoloration due to the DDT spray. In order to assist in these areas, the project will fund 78,000 quality spray tips that will allow for more effective and efficient coverage of insecticide. Poor quality and worn spray tips allow more insecticide to be sprayed thus increasing discoloration and greatly increasing insecticide costs. The project will also fund the purchase of 2,000 new sprayers to replace the oldest of the Malaria Division's 5,300 units, 90% of which are over 10 years old. Spare parts such as rubber gaskets and other easily worn sprayer components will also be procured.

-- Motorcycle Fund - One of the major problems confronting the Malaria Division is the supervision system for sector level employees and volunteers. At the present time, supervisor-worker contact takes place on approximately a once every two weeks basis under ideal circumstances, and in remote areas (which also are generally highly malariogenic) the contact interval is generally a month or more. Much of the reason for the lack of regularized contact can be traced to a serious lack of transportation. In order to resolve this problem and insure that motivated tambon and village malaria workers stay active and interested in malaria control activities, the project is proposing to finance a motorcycle purchase fund that would allow sector level workers to buy a motorcycle at the commencement of the project, and then reimburse the fund for both the purchase price and administrative costs through monthly payments

from their salaries. The establishment of this fund would remove the lack of transportation as a problem associated with tambon and village level supervision. Since the vehicles would be available as soon as the project started, it would relieve a major constraint to successful implementation. As discussed elsewhere, the RTG has already agreed to substantially increase the operating budget during the project life to insure that per diem and gasoline reimbursements will be available for sector level workers.

Although the creation of the fund may cause some minor administrative problems, the Malaria Division is confident that it can structure a control system that will address all anticipated problems, including a schedule of charges that would cover losses, defaults and replacement of the motor cycles, thus ensuring the maintenance of the value of the fund. The Project Agreement will contain a condition precedent defining the submission of a plan containing the proposed administrative arrangements, as well as the proposed schedule of charges. The successful operation of the purchase fund will demonstrate that similar systems could be institutionalized in future projects to promote the efficiency of the civil service at no cost to the Royal Thai Government as the purchase price and the carrying charges will be fully reimbursed by purchasers.

-- Short-term Consultants - The short term consultants provided under the project will allow for the flexible operational expertise needed in a malaria control effort. With such expertise available, problems identified in the research or operational component of the malaria program can have highly trained consultants quickly brought to bear in order to formulate an appropriate solution. This project component will allow the Malaria Division to react to problems as they arise rather than having to predict possible problems prior to project commencement.

-- Operational Budget - A substantial annual increase in the operational budget for the Malaria Division will be required as a condition precedent for the loan. With the added emphasis on field activities, early identification, and treatment there is a need for additional money for operations. The increased operational budget will provide more money for per diem, gasoline, drugs and other recurrent expenditures in support of the project.

(4) Improved Vehicle Maintenance Capability:

The Malaria Division has a fleet of 598 vehicles with an average age of 12 years. (In fact all but 32 vehicles are six years of age or older.) About 85% of the fleet has originated from one supplier, American Motors, and all but 30 are U.S. produced. The Malaria Division has several problems with their vehicle maintenance operation: the fleet is old, breakdowns are frequent, parts have to be imported and are expensive, and the facilities and manpower in the maintenance operation need improvement. An improved and better maintained fleet will enable the Malaria Division to better carry out its anti-malaria effort in addition to greatly improving the supervision capability of program managers at the regional and zone levels.

AID intends to offer assistance in the following manner:

-- Vehicle Maintenance Consultant - The maintenance operation needs someone with fleet maintenance experience to set up protocols for maintenance, safety and training in addition to assessing parts, tool and equipment needs and planning shop operations.

-- Mechanics' Training - Although the mechanics presently working in the national, regional, and zone maintenance facilities are doing the best they can considering limited facilities and budgets, maintenance operations do need considerable improvement. All fifty of the Malaria Division's mechanics will be trained in preventive maintenance scheduling and operations, and appropriate repair operations. There is a particular need for training in body and frame repair as many of the vehicles receive very rough treatment under field conditions.

-- Equipment - At the present time the tools and equipment available to the mechanics are very old and severely limited in number. Many routine jobs are slowed due to inappropriate or insufficient equipment. The project will improve the shop capabilities in all five regional garages and selected zonal maintenance facilities.

-- Overhauls and Spare Parts - Spare parts are a critical problem for the Malaria Division since most of the vehicles are very old and require frequent spares. Spare parts are expensive and often not readily available thus causing cannibilization of vehicles. (This is often easy as about 75% of the fleet is made up of four models.) To improve this situation it is proposed to completely overhaul 400 of the approximately 600 vehicles in the fleet and to stock all of the regional garages with an inventory of commonly used spare parts. This approach is more cost effective than procuring new vehicles and should significantly reduce the cost of spare parts, oil and gasoline consumption for the overhauled vehicles, thus also contributing to a reduction of recurrent costs for these items.

(5) Improved Training Capability

At the present time the Malaria Division has a national training facility located in Region I. The teaching facility has one classroom, a library and an office. In addition there is a 30 person dormitory at the site. As training operations increase during the project period and beyond, there will be a need for larger facilities and competence will have to be developed to teach

malaria control activities to non-professional and volunteer malaria workers. The AID assisted project will finance:

-- Expansion of the Training Center-More classroom and laboratory facilities will be available for training 30 more personnel in addition to enlarging material production capability. Details are in Annex F.

-- Living Quarters - An additional dormitory will be constructed and the old one improved in order to provide adequate quarters for long term trainees studying at the facility. Further, the Malaria Division plans to increase its follow-up training sessions thus keeping facilities in use on a regular basis. Details are in Annex F.

-- Training and Materials Development Consultant - The expanded emphasis on volunteer and village level workers is going to create a need for appropriate teaching method and material development. At the present time, much of the training at the center is conducted for professional level workers, and the approach differs from what would be appropriate for less sophisticated students. A short term consultant will be funded to aid in the development of these approaches and materials.

-- Materials - Since much of the written materials in malaria control is not appropriate for semi or non-literate rural residents, the project will support development and production of appropriate informational and teaching materials.

-- Training Monitor - A full time training monitor to live at the training facility and assist in the planning and implementation of course activities and materials development is planned for financing under the grant.

(6) Trained Manpower In Place:

The efficient and effective operation of the malaria control program depends on competent personnel deployed in the field. The Malaria Division is now facing a severe personpower shortage (there are 256 vacancies of 898 authorized positions), and in the near future many of the leaders in the Division that came into the field during the massive operations of the 1950's and 1960's will be retiring. In other words, there is a danger that when the present leadership reaches retirement age in five or ten years, there will not be adequate

trained and experienced persons in the system to move up and fill leadership positions. Because of the unique aspects of malaria control, experience is extremely important in managing an effective program. AID proposes to assist in the following manner:

-- Academic Training - The project will fund Master level training in Public Health Schools in the United States for seven persons. In addition, it is proposed to provide two-year scholarships to the M.S. level for seven entomology students in Thai universities. These persons would be recruited from Malaria Division and/or non-Malaria Division workers and would be committed to work in the malaria field for four more years following graduation.

-- Regional/Zonal/Sector Training - The project will finance short-term training activities both in Thailand and in other countries for line personnel in order to enable them to keep abreast of the activities in the field of malaria.

-- Volunteer and Communicator Training - The project will finance the training and equipment costs for 12,000 village volunteers and communicators. Their initial deployment will be focused on, but not limited to, sectors having high malaria transmission that fall within the perview of the Rural Primary Health Care Project. The project is also financing the training of all 72 PCMO's and their assistants throughout the country, with the intention that the Malaria Division can demonstrate the advantages of coordinating the efforts of all of the health service personnel and facilities in a given area on malaria control. The "integrated" approach at the service level is expected to reduce duplication and insure that the highest quality care available is given in an efficient and responsive fashion. Although it is expected that the "integration" process will be conducted on a country-wide basis, during the first year the project will put priority on replication of an integrated approach in the 20 provinces of the on-going Primary Health Care Expansion Loan thus enhancing the effects of both projects. Materials and information will be provided for many more persons than those in the 20 province area, and depending on the availability of governmental funding, the training effort will be expanded as positive results are received. All project personnel at the volunteer and communicator level will receive refresher training at six month intervals to maintain interest and to check on progress and effectiveness. The practice of volunteer and communicator performance rewards and recognition, that has been effective in the Malaria Division for the past ten years, will be expanded and continued.

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-- Training of Microscopists - The project will fund the training and per diem costs for 250 microscopists that are scheduled to be trained for the expansion of sector clinics.

Details for all the training activities can be found in Annex C and F.

(7) Operational Research Completed:

Operational research is extremely important for the project not only in assessing the value of on-going control methods, but also in testing new methods of operation in order to prepare for unforseen changes in effectiveness. In addition, program administrators have to be sensitive to regional differences in control techniques in order to insure that each region and/or zone is using the best or most effective technique for malaria control.

Thailand is rather unique in that it has very rich research potential within the Malaria Division in addition to the assistance from the World Health Organization staff, and informal ties with the Armed Forces Research Institutes for Medical Sciences (AFRIMS) and Thai university facilities.

This project's research component will strengthen the operational research potential within the Malaria Division. (As much of the technical and academic research work is being done elsewhere in Thailand, it is not necessary to duplicate this basic research capability.) Specifically, the project will fund:

-- Experimental Pharmaceuticals and Chemicals - Drug resistance and insecticide resistance are always possible when trying to control malaria. The Malaria Division has a limited research budget. In order to be able to react quickly should wide-spread difficulties arise, alternative methods must be field tested and results examined. The project will fund the cost of the materials for such testing and experimentation.

-- Operational Research - The project is providing a fund for use in operational research endeavors that are carried out within the Malaria Division's research section. (This money is to be used to strengthen the Malaria Division's capability to do operational research, and is not to be used for third party contracts.) Since WHO is also funding research in Thailand, efforts will be closely coordinated

with them. A detail of potential experimental studies is given in Annex G. Assistance in setting the protocols for the research work will be given by WHO and the personnel of the AFRIMS facility.

-- Social Research - One of the operational research components will deal with the social constraints that affect malaria control. People's reluctance to allow spraying, failure to take full drug regimens, migratory patterns, and the perceptions of illness are some of the issues that must be examined in order to improve malaria control activities.

-- Laboratory Facility - At the present time there is a small laboratory and insectarium at the Region I training center. The project will fund minor improvements in the facility, and more fully integrate it into the teaching activities that will be going on at the training facility. In addition, by grouping the teaching institution and laboratory at one place, the facility will be more suitably equipped to handle international groups interested in looking at Thailand's malaria technology.

-- Laboratory Equipment - There is a need for laboratory equipment both at the national laboratory and at the regional and zonal laboratories. The equipment is detailed in Annex F.

(8) Evaluation

The evaluation component of this project is very important as it is hoped that the approaches funded under this project will have a major use in shaping the malaria control activities for the next five year plan commencing in 1982. The project will fund two major evaluation efforts, the first is planned for 1980 and the second at the end of the project. The evaluation effort will be closely coordinated with the overall evaluation of the ongoing RTG Malaria Program. Details of evaluation plan are given elsewhere in this PP.

d. Inputs

(1) Royal Thai Government

(a) Funding:

The Malaria Division of the Department of Communicable Disease Control of the Royal Thai Government's Ministry of Public Health has been supporting an active malaria control program since 1949. During the past four years the financial commitment to malaria control has risen each year as detailed below:

1975	$5,523,000
1976	6,857,000
1977	7,132,000
1978	7,730,000

In 1979, the budget has been projected at $8,390,000. In addition, the project includes a condition precedent calling for a substantial annual increase in operating funds during the life of the project. The most significant aspect of this proposed project is that neither the AID grant nor loan money are paying for on-going recurring expenses, thus insuring that new ideas and methods that are supported through project funds will be able to continue regardless of external assistance.

(b) Personnel:

The personnel system for the Malaria Division is detailed in Part IV of this paper. The Malaria Division has been maintaining an effective personnel system with no outside donor assistance for the past six years and will continue to do so under this project as no project monies will be used for either salary or per diem payments.

(2) World Health Organization

The bulk of the WHO fiscal commitment to the Malaria Division is spent on technical cooperation through the sponsoring of three in-country technical personnel. This amounts to $425,000 over the life of the project.

In addition, WHO has budgeted for the following fiscal commitments:

(a) Training - $115,000 for technical training in entomology and epidemiology.

(b) Research - $95,000 for operational research activities.

(c) Commodities - $70,000 for laboratory and research commodity support.

(d) Evaluation - $10,000 for the 1979 malaria evaluation. Not included in the above budgetary figures is the benefit that accrues to the Malaria Division through the worldwide malaria coordination efforts of WHO which focus on standards of insecticides and pharmaceuticals in addition to research, administrative record keeping and international program communication support that is financed through the budget of the international organization.

(3) United States Agency for International Development

(a) Technical Assistance (Grant):

- 2 full time in-country malaria monitors @$15,000 per year	$ 90,000
- 20 person months of consultative services @$7,000 per month	$140,000
- Private sector host country information marketing contract (USAID:$70,000, Thai counterpart funding:$90,000; total activity funding: $160,000)	$ 70,000
- Evaluation	$ 40,000
SUB-TOTAL	$340,000

(b) Training (Grant/Thai Counterpart Funds):

- 7 M.S. candidates trained in U.S. @$15,000/yr. (USAID: $100,000, Thai counterpart funding: $110,000; total activity funding: $210,000)	$100,000
- 35 3rd country observation tours @$2,000 (USAID: $35,000, Thai counterpart funding: $35,000; total activity funding: $70,000)	$ 35,000

- 12 U.S. observation tours @$4,000 (USAID: $25,000, Thai counterpart funding: $25,000; total activity funding: $50,000)	$25,000
- 7 M.S. candidates in country @$4,000 each by counterpart funding: $28,000	---
SUB-TOTAL	$160,000

(c) Training (Loan)

- 250 Microscopists @$240 per person	$ 60,000
- 50 Trainers of trainers @$200 per person	$ 10,000
- 400 Trainers of volunteers @$100 per person	$ 40,000
- 12,000 Village malaria volunteers with refresher course @$30 per person	$360,000
- 144 Provincial health personnel @$100 per person	$ 15,000
- 400 Malaria field personnel @$200 per person	$ 80,000
- 50 vehicle maintenance workers @$200 per person	$ 10,000
SUB-TOTAL	$575,000

(d) Funds for Construction, Commodities, Research, and Revolving Funds for Motorcycle Purchase (Loan)

(1) Construction

- Training and dormitory facility (equipped)	$350,000
- 1 Existing training facility improved	$ 20,000
- 3 Laboratories improved @$50,000	$150,000

(2) Commodities

- 3 Laboratories equipped @$10,000 each	$ 30,000
- 300 Microscopes @$1,000	$300,000
- Microscope spare parts	$ 25,000
- 2,000 Sprayers @$55	$110,000
- Spare parts for sprayers	$ 20,000
- 80,000 Spray tips @$1.25	$100,000
- Software production for health education	$100,000
- 6 Sets of audio-visual equipment for 5 Regions and National Training Center @$10,000 per set	$ 60,000
- 5 Regional vehicle repair shops equipped @$10,000	$ 50,000
- 33 Zonal vehicle repair shops equipped @$2,000	$ 70,000
- 400 Overhauled vehicles @$1,000	$400,000
- 12,000 Village Malaria Volunteer Kits @$10 each	$120,000

(3) Revolving Fund for Motorcycle Purchase	
- Initial financing for 400 motorcycles to be used at sector level @$800	$320,000
(4) Research	
- 10 Operational research projects @$30,000 each	$300,000
SUB-TOTAL	$2,525,000
Total (a,b,c and d):	$3,600,000
Inflation Factor (12½%)	450,000
Contingency Factor (12½%)	450,000
USAID-TOTAL	$4,500,000

SUMMARY

USAID Grant Funds	$ 500,000
USAID Loan Funds	$4,000,000
SUB-TOTAL	$4,500,000
RTG Counterpart Funds	288,000
GRAND-TOTAL	$4,788,000

(4) Peace Corps

The Peace Corps presently has eight volunteers in-country working in malaria control: 2 laboratory specialists, one entomologist, 4 vector control field specialists, and one health education trainer. The introduction of future volunteers to work in the program depends on the success of the recently arrived volunteers which, if positive, is expected to lead to a request by the Royal Thai Government. Both the Malaria Division and the Thai Government Liaison agency (DTEC) are looking very carefully at the 4 field workers mentioned above to ascertain their effectiveness. The budget of the Peace Corps during the life of the project is estimated at $320,000.

III. Project Analysis

A. Technical Feasibility Summary

(See Annex G for Detailed Analysis).

The RTG has demonstrated its ability to implement the global malaria eradication scheme outlined in the Sixth Report of the WHO Expert Committee on Malaria. However, certain factors such as changes in vector behavior and human, social and demographic characteristics have made eradication techniques less effective in certain highly endemic areas. This project proposes to search for and apply new approaches to the malaria problem in these areas as well as strengthen the on-going activities of the Malaria Division.

RTG strategy is to continue its effective active and passive case detection activity in the eradication areas, and combine with limited house spraying operations applied when and where epidemiological data signal transmission foci. In control areas, major reliance will continue to be placed on house - spraying with DDT, supplemented or replaced by other methods as indicated by local conditions.

DDT is still the insecticide of choice in Thailand for malaria control. No significant resistance by vectors to DDT has been found. The DDT in use meets all applicable AID and WHO requirements.

Spray equipment is very old and many sprayers need replacement. Provision of 2,000 new sprayers, nozzles and spare parts should adequately address the problem.

The provision of local level malaria clinics proposed in the project will supplement vector control activities and should have a strong effect in reducing malaria deaths by P. falciparum, and help prevent further malaria transmission by eliminating gametocytes and rendering the host non-infectious to vectors feeding shortly after treatment. The WHO has already demonstrated the feasibility of the clinics in 50 areas.

Mobility of malaria workers has been severely restricted by transportation problems and insufficient

operational budget. The proposed improvements of the vehicle fleet and other components of the project should markedly improve the mobility of workers.

Technical personnel need upgrading if innovative technical approaches are to be adopted on a long term basis. Training in several areas as proposed in the project, along with improvement in the RTG training facilities and program, are needed to adequately equip the AMP for the future.

Some degree of resistence by parasites to certain drugs has been detected in parts of Thailand. Research is needed to determine the extent of the problem and to plan an adequate response. Other problems addressed by the project include householders' refusal of DDT spraying and insurgency in border areas. The whole area of health education needs strengthening. Although little can be done to resolve the insurgency problem through this project, the other problems are addressed through the research, technical assistance and health education components.

It is concluded that the anti-malaria program and proposed project are technically sound and that the planned objectives can be obtained. Plans and cost estimates are adequate to meet the requirements of FAA Section 611(a).

B. Social Soundness Analysis Summary

(Detailed Analysis is in Annex H).

Many social factors common to Thailand make malaria control difficult. These factors include living styles and income generation which supersede health considerations for many. Tin and gem mining activities are in highly malarious areas and migration of workers make control difficult. Illegal logging constitutes another problem for malaria control since loggers are reluctant to be identified. Rubber plantations and cultivation practices provide ideal conditions for vectors. Farming and employment patterns include a large amount of migration between malaria transmission and non-transmission areas.

Certain Thai cultural characteristics also contribute to the spread of malaria. Villagers often gather

outside in the evening to socialize and this is when the malaria vector is active. Repellents, screens, mosquito nets and sprays are expensive and not popular with many rural Thais. Old beliefs concerning malaria transmission through water interfere with health education measures. Private health facilities of questionable effectiveness are often preferred by rural Thais to government facilities, due in part to the importance private clinics place on cultivating good inter-personal relationships with their patients. A complicating factor is villagers' tolerance to pain in general and reluctance to seek any treatment at early symptomatic stages of the disease. In addition, drug regimens are often not completed after symptoms are gone.

Many villagers have become reluctant to allow spray teams to spray their houses. Messiness of spraying and several side effects are often the reason for spray refusals along with a lack of understanding of the need for spraying. Spray teams are sometimes insensitive to villager's concerns and do not have adequate transport and logistic support.

Better health education, community participation and malaria worker support will be financed under this project, thus addressing many of the social constraints to malaria control. Beneficiencies are primarily inhabitants of malaria control areas and are among the poorest people in Thailand. The project should have a significant positive effect on these people by reducing labor time lost to sickness and generally improving their health status.

C. Economic Analysis

1. Introduction

The Royal Thai Government (RTG) with assistance from the Agency for International Development, Peace Corps and the World Health Organization proposes to strengthen the capability of the Malaria Division to provide and maintain adequate malaria control services in Thailand's endemic areas. It will concentrate on relieving key constraints to control activities in these priority areas, which have a total population of more than 8 million predominantly rural poor.

It is the intention of the AID supported malaria effort in Thailand that the funding be used to:

- develop and strengthen the institutional capability of the RTG's Malaria Division in order to enable it to better meet the demands of malaria control in the country.

- enable the RTG's Malaria Division to test new approaches to malaria control so that they can be incorporated in the next five year plan of operations of both the Malaria Division and WHO.

- support new activities of the RTG anti-malaria effort and not supplant existing ongoing efforts.

This economic analysis attempts to assess the likely benefits and costs resulting from this project.

Benefit from health investments in general and communicable disease investments in particular are notoriously difficult to estimate. The present analysis has proved to be no exception. Data, when not altogether lacking, is for the most part incomplete and consequently we can only provide general trends or rough magnitudes of the expected benefits from the proposed malaria activitiy.

2. Benefits

More effective malaria control will furnish a wide array of benefits. In general, the disease prevention aspects of the Malaria and Vector Control program can be expected to prevent the loss of production to society and reduce medical expenditures by those not contacting the disease. Secondly, we find that malaria control programs in Thailand have desirable income distribution properties. Since malaria disproportionately affects people in rural areas, the prime beneficiaries of malaria control are the rural poor. Finally, the prevention of pain and suffering, and improvement in the quality of life are the primary reasons for health programs and must be recognized as legitimate, albeit non-measurable, benefits. The discussion below describes

each class of benefit in more detail.

Income (or production) to society is lost when members of the labor force are prevented from working, or when at work, are less than efficient due to disease. Additionally, there are losses of productive services when family members (housewives and children) are prevented from performing household services. Household services have no market price and there is no way of imputing a value to them. Nevertheless, their loss is a real economic cost. At present, only the lost output of affected members of the labor force will be measured.

Substantial seasonal and hidden unemployment already exist, and the labor force is growing at a rate faster than new additions can find employment. Therefore, the benefits from disease prevention will be less than if the above conditions did not prevail. The National Statistical Office (NSO) of the RTG officially puts open unemployment at 1% for the whole Kingdom. That is, all persons eleven years of age and older not working but actively seeking work probably does not exceed 1% of the labor force. Whether that rate is correct or not, depends on the definition of unemployment.

A problem centers around the definition of "not working". It does not take into account seasonal employment, involuntary part-time employment, and non-productive underemployment. If the various measures of "hidden unemployment" are added, then unemployment, especially in rural areas, assumes far greater importance. While data is incomplete, unemployment, (broadly defined) probably causes a 20-30 percent reduction in available work hours. For purposes of this study, it will be assumed that 25% of the labor force are affected by hidden unemployment.

Society will be able to avoid future medical cost due to the reduction in the incidence of malaria. These costs include expenditures for drugs, clinical and hospital costs. It is expected that this project will substantially decrease morbidity and mortality rates through faster detection and treatment. A major reason for this is the expansion of services to endemic rural areas. The medium range goal for this project is to

reduce mortality to 9 deaths in every 100,000 population from its current rate of 10.6, and a 30% reduction in the annual parasite incidence (API) by 1982.

Secondly, one of the principal goals of the project is long range control activities in the high risk mountainuous and international border areas with a 1978 population of 8.7 million. The greatest majority of these, being subsistance farmers, would be the principle beneficiaries of this project. Improving their well being would have a definite impact on their level of income.

Finally, a third benefit arising from disease control is the consumption benefit of allowing people to be free from pain and discomfort. Health investments are somewhat peculiar in that they normally have a large consumption component. Considerable pain and suffering are avoided through health investment, and in most cases, the investment will be made regardless of economic efficiency. A primary example is the sizeable monetary resource expended for terminal cancer patients.

Because consumption is the ultimate goal of all economic activity, such investments are made for only their consumption component. The amount of money a person is willing to pay to avoid pain and discomfort may be a measure of the value of avoiding the disutility. However, in the present study, there is no method for measuring the consumption benefits of prevented pain and discomfort. Nevertheless, it is important to keep in mind that these consumption benefits are very important (although non-measurable) and may very well exceed in importance the other benefits of avoided income loss and medical cost.

3. Cost

The total cost of this project is approximately US $33.5 million. AID's share of the project's costs is US $4.5 million, of which US $0.5 million will be in the form of a grant. WHO and PC shares are expected to be US $0.7 million and US $0.3 million respectively. The RTG will be matching the AID contribution with approximately US $28 million to cover the general operating and maintenance costs of the project.

Costs are not categorized into their domestic and foreign exchange components as it is not necessary to shadow price foreign procurement. The market value of the baht is at or near the official exchange rate.

The time distribution of cost is presented below. At the completion of project expenditures in 1981, there will be recurring operating and maintenance costs to the RTG. It is not known for certain what will be the level of these recurring costs but it is assumed that the costs during the first three years of the project will continue for seven years after the initial project period. Similarly the benefit stream, which does not begin to produce positive benefits until the fifth year is assumed to continue for seven years after the project is initiated.

4. Results of Calculations

A cursory examination of the trends in reported cases of malaria show an average annual increase of over 16%, in cases reported from 1974 to 1977. However, mortality shows a declining trend for the same period, from 15.8 to 10.6 (1977 being the last year

Project Costs in US$000's

	YEAR	AID	AC	WHO	RTG	TOTAL
	1	940	80	200	8,400	9,520
	2	1,715	160	290	8,625	10,790
	3	1,495	80	225	8,875	10,675
Sub Total		4,050	320	715	25,900	30,985
Inflation Factor		450	___	___	2,100	2,550 1/
Total Project Costs		4,500	320	715	28,000	33,535 2/

1/ Although the AID and RTG contributions to the three years of the project are expected to be US$ 4.5 million and US$ 28 million respectively, a total amount of US$ 2.55 million, which represents our estimate of increases in project costs due to inflation, was factored out for the purposes of the economic analysis.

2/ Over the planned ten year life of the RTG Anti-Malaria Program, it is expected that there will be a substantial annual expansion of the operational budget sufficient to enable the RTG to carry out its effort as planned. (During the three years of the proposed AID assistance, a substantial annual increase in the operational budget for the Malaria Division will be required as a condition precedent for the loan.)

data is available). Projections based on the above trends would most likely result in a project that was not viable from an economic point of view.

Our analysis, although not disregarding trends entirely was based on extremely conservation estimates and produced an internal rate of return (IRR) of 6.3% with a benefit cost ratio of less than one, and a net present value (NPV) at 12% of minus US $6,529,000, assuming a 10-year life of project.

The above figures were based on the following assumptions.

1) That the reported malaria cases were 75% of the actual incidence.

2) That morbidity, permitted to go unchecked, would increase at an annual rate of 8.5% (3 year trend).

3) That with the project, mortality would be gradually reduced by 50% by 1987.

4) That although historically the mortality rate has never been 10.1 even under the most favorable circumstances, no further improvement in the mortality rate can be expected without increased financial input. We therefore projected a constant mortality rate of 10.6 throughout the 10 year benefit stream.

5) That with the project, the mortality rate would be gradually reduced to 9 by 1982 and 5 by 1986.

As indicated above, the estimates are conservative. It is generally believed that the actual morbidity rate is a figure that lies somewhere between 33% and 100% more than the actual reported cases.

Based on the assumption that the true morbidity rate is 1/3 to 2 times higher than the current reported cases, we conducted a sensitivity analysis using a doubling of the reported cases to give us an upper range from which to compare. We found that the IRR increased from 6.3 to 13.3%, while the B:C ratio and NPV improved to a positive 1.03 and US $4,172,000 respectively. Finally, our analysis does not take into account losses suffered by the

unemployed, housewives or children or the positive effect the project will have on income distribution. Moreover, no attempt has been made to measure the importance of avoiding pain, discomfort and death - the true reasons for which societies make health investments.

D. Summary of Favorable and Adverse Environmental Effects

The most favorable impact of the malaria control program is the improvement in health conditions and the reduction in the death rate. There is also an increase in attendance at educational and governmental institutions and agencies, increased productivity, both agricultural and industrial. Tourism would receive a favorable impact, with a resultant increase in the foreign exchange. The major favorable impact on land use would be an expansion of land settlement and agricultural development. A significant part of the growth of the GNP can be attributed to the malaria control program.

The anticipated unfavorable impacts are minor, more potential than actual. The use of DDT presents no known hazard to operational personnel or to the occupants of the habitations that are sprayed. The unfavorable impact on the social environment is theoretical. The rate of population growth did not increase as the malaria mortality rate declined. In fact, the rate of population growth declined, because of the efficiency of family planning and probably economic development. There is an effect on the economic environment in that the malaria control program diverts large sums of money and manpower away from other projects. As an effective malaria control program will result in the expansion of use of previously uninhabitable lands, which in turn will have an effect on the natural environment, that can be considered a possible adverse effect.

It is expected that there will be little or no effect, adverse or favorable on the quality of air and water.

In conclusion, the malaria control program should not have any significant effect on the environment, except improvement of health conditions. It obviously does not degrade the quality of the human environment or curtail the range of beneficial uses of the human environment and its resources. It has no effect on any natural or

cultural heritage.

A detailed environmental assessment has been prepared for this project and submitted to AID/Washington. The results and significance of the assessment were fully discussed with the RTG.

E. Financial Analysis and Plan

Tables III.E.1. and III.E.2. summarize the cost estimate and financial plan for the $4.0 million loan and $0.5 million grant. These funds will be used to finance inputs and outputs described in the Detailed Project Description Part II.B.4. Generally, the AID contribution will finance $230,000 of technical assistance, $70,000 of services for preparing health education materials, $40,000 of evaluation services, and $160,000 of out-of-the country training under the grant; and $575,000 of training, $300,000 of priority research, $520,000 of capital improvements/ construction for training and research facilities, $385,000 of foreign exchange commodities such as microscopes and sprayers, $400,000 for overhauling vehicles, $100,000 of materials for health education, and $320,000 for establishing a motorcycle revolving purchase fund under the loan.

Other donors (WHO and Peace Corps) are expected to provide over $1.0 million of assistance for the malaria control effort in Thailand over the 3 year project life and the RTG plans to budget a minimum of $28 million equivalent for malaria control over the same period. The RTG will therefore provide more than 80% of the total $33.5 million anti-malaria effort from 1979-1981, thus exceeding the requirements of FAA Section 110(a).

A description of the financial arrangements follows in Part IV.

F. Role of Women

The mosquito does not discriminate as to whom it bites. Likewise the benefits from this program accrue to both men and women since anyone with malaria is entitled to free treatment. However, women may actually receive an added benefit from treatment since malaria contributes to an increase in spontaneous abortion, premature labor, and still births thus having a significant adverse emotional and health impact upon rural poor women in Thailand. In

addition, anemia is a problem for many poor rural women of reproductive age in Thailand, and malaria (which attacks the red cell in the blood) exacerbates symptoms among anemic women. The early diagnosis and treatment being sponsored in this project will minimize the health risks associated with malaria even when the disease is complicated by anemia.

Within the Malaria Division, women have traditionally been well represented in the staffing pattern. In this program, it is expected that women will be trained in scientific fields (entomology, epidemiology and parasitology) as well as trained as microscopists and volunteers. The program may also experiment with women as spray-persons for some of the areas in the south of Thailand in order to make spray-persons more acceptable for the Moslem population.

G. Population Impact

More effective malaria control may have an initial effect of allowing for increased population growth due to the reduction of malaria mortality rates and birth interruptions, however, the long term effect may contribute to the stabilization - or possible reduction - of population growth rates. Since the control and commensurate reduction in malaria rates in rural areas will allow for more economic growth through increase productivity of rural persons that enjoy freedom from the disease, project planners postulate that this improved economic status will contribute to lower birth rates. Improved economic status has long been associated with reductions in population growth rates, and since the reported malaria cases for 1977 indicate that the disease strikes at least one out of twenty five persons living in the endemic areas, an early identification and treatment program should have a significant favorable economic impact in these locations. In addition, the provision of responsive medical care in remote areas will also stimulate interest in other government sponsored health programs so that family planning receptivity rates should increase as a result of a successful effort.

Table III.E.1

Summary Cost Estimate and Financial Plan
(US $000)

Project Component	AID Loan		AID Grant		WHO		Peace Corps		RTG	Total	
	FX	LC	FX	LC	FX	LC	FX	LC	LC	FX	LC
1. Technical Assistance	–	–	230	–	405	20	160	160	–	795	180
2. Training	–	575	160	–	70	45	–	–	290	230	910
3. Research	–	300	–	–	95	–	–	–	–	95	300
4. Capital Improvements	–	520	–	–	–	–	–	–	–	–	520
5. Commodities	885	–	–	–	70	–	–	–	–	955	–
6. Vehicle Overhauls	–	400	–	–	–	–	–	–	–	–	400
7. Health Education Software and material support	–	100	–	70	–	–	–	–	–	–	170
8. Revolving Fund	–	320	–	–	–	–	–	–	–	–	320
9. Evaluation	–	–	40	–	10	–	–	–	–	50	–
10. Other*	–	–	–	–	–	–	–	–	28,000	–	28,000
Sub-Total	885	2,215	430	70	650	65	160	160	28,290	2,125	30,800
Inflation Factor (12½%)	130	320	Included		Included		Included			130	320
Contingency (12½%)	130	320								130	320
Total (rounded)	1,145	2,855	430	70	650	65	160	160	28,290	2,385	31,440
Combined Totals	4,000		500		715		320		28,290	$33.5 million	

*Comprises projected RTG Malaria Control Budgets 1979-1981

Table III.E.2

Projection of Expenditures by Fiscal Year
(US $000)

Source	FY 79	FY 80	FY 81	FY 82	Total
AID Grant					
Technical Assistance	60	75	65	30	230
Training	10	70	60	20	160
Health Education Software Production	-	20	30	20	70
Evaluation	-	20	-	20	40
Total Grant	70	185	155	90	500
AID Loan					
Training	10	255	200	110	575
Construction	-	250	250	20	520
Commodities	230	435	120	100	885
Purchase Fund	320	-	-	-	320
Vehicle Overhauls	-	150	150	100	400
Education Software	-	40	40	20	100
Research	-	50	150	100	300
Sub-Total Loan	560	1,180	910	450	3,100
Inflation (12½%)	35	140	165	110	450
Contingency (12½%)	85	165	130	70	450
Total Loan	680	1,485	1,205	630	$4.0 million

PART IV Implementation Arrangements

A. Analysis of the Recipients and AID's Administrative Arrangements

1. Recipients Administrative Arrangements

a. General

The Malaria Division is a division of the Department of Communicable Disease Control (CDC) of the Ministry of Public Health. Figure IV-1 shows the organization of the Malaria Division. The Director of Malaria Division, a Doctor of Medicine, has authority and responsibility for the direction and implementation of the program, has full control over the entire staff and equipment, and is authorized to incur all expenditures provided for in the budget.

Operational responsibility is delegated to regional directors, who are malarialogists with MDs. The regions have been divided into zones (5-7 zones) and each zone is sub-divided into sectors. Each zone and each sector is directed by a Zone Chief and Sector Chief respectively. They are under the direct supervision of the Regional Malariologist, who has seven section heads to assist him in operations. According to the 1978 Plan of Action, the regional break down is as follows:

Region I serving 12 provinces with an estimated population of 8,551,989, with headquarters located in Phrabuddatabat, Saraburi. This region has 7 zones and 59 sectors.

Region II serving 13 provinces with an estimated population of 6,879,459, with headquarters located in Chiengmai. This region has 6 zones and 62 sectors.

Region III serving 11 provinces with an estimated population of 8,847,257, with headquarters located in Khon Khaen. This region has 6 zones and 58 sectors.

Region IV serving 14 provinces with an estimated population of 4,973,101, with headquarters located in Songkhla. This region has 7 zones and 64 sectors.

ORGANIZATION CHART OF MALARIA DIVISION

DEPARTMENT OF COMMUNICABLE DISEASE CONTROL

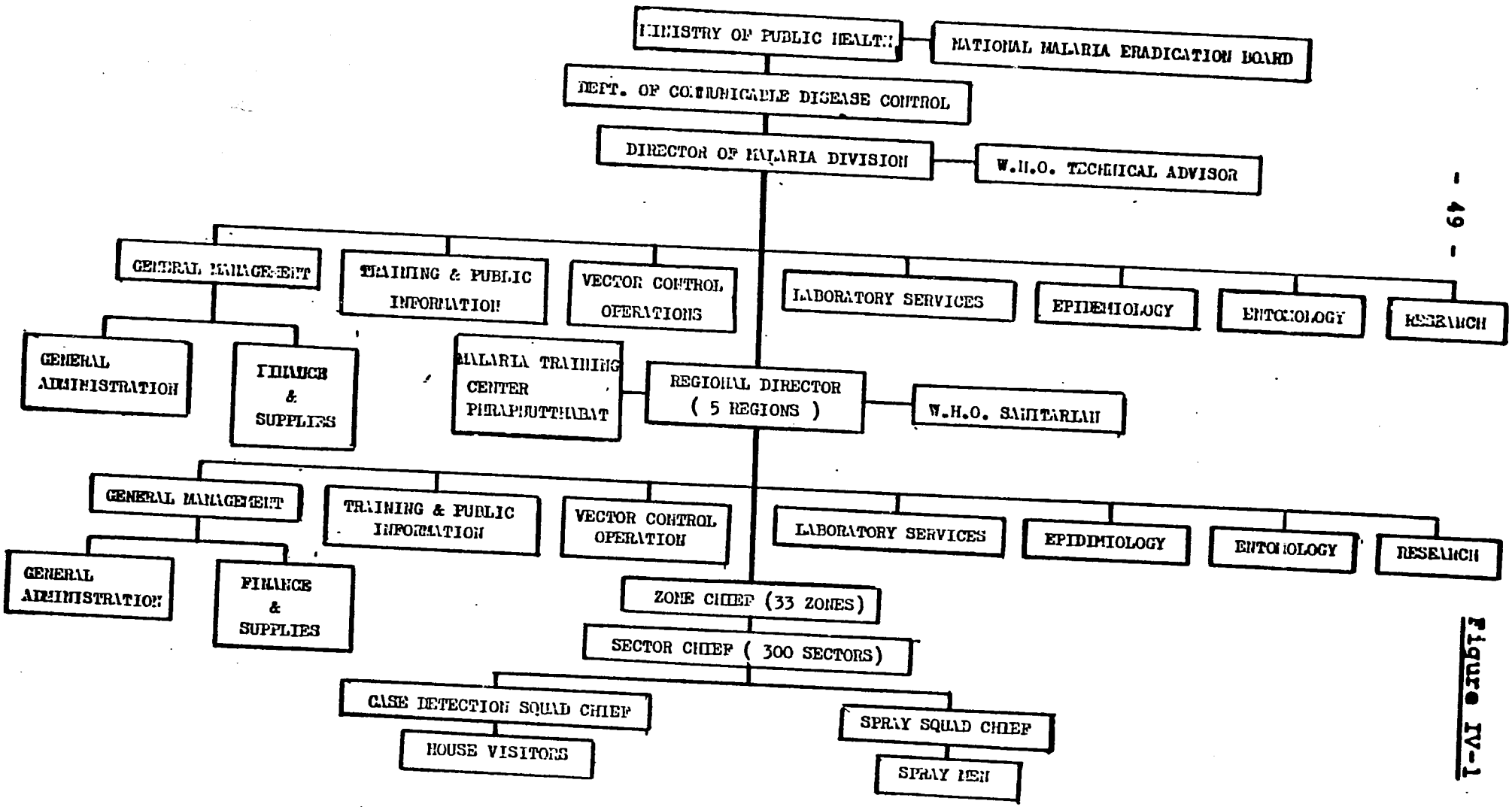

Figure IV-1

Region V serving 22 provinces with an estimated population of 12,628,626, with headquarters located at the Ministry of Public Health, Bangkok. This region has 7 zones and 57 sectors.

All together, the five regions have 33 zones and 300 sectors, covering 72 provinces with a population of 41,980,432 people. Figure IV-2 locates the regional and zone headquarters. The Malaria Division, both at national and regional levels, is divided into seven sections: General Management, Training, Public Information, Vector Control Operations, Epidemiology, Entomology, Laboratory Services, and Research. The functions of these sections are described in Annex I.

b. Voluntary Organization

Besides the paid malaria workers, there is a network of voluntary community malaria workers. These workers consist of malaria "Collaborators" who take blood slides and provide presumptive treatment to anyone who contacts them, and "Communicators" who inform villagers of the components of the malaria program. Both types of volunteers are recruited, trained, and supervised by sector chiefs and their assistants. The target of the anti-malaria program is to have at least one collaborator and several communicators in each village of the country. To date about 14,000 collaborators and 100,000 communicators have been recruited and there is a need for about 11,000 more collaborators and 150,000 more communicators to reach the programs' target.

2. Organizational Analysis

a. General

The integrated, vertical organization of the Malaria Division facilitates strong central planning of all anti-malaria operations, and helps ensure that funds once allocated are not diverted to competing priorities outside of the malaria program. The institution of regional directorates under competent malariologists has also permitted decentralized administration of program implementation and has enabled prompt responses to localized problems. Although the Malaria Division is not completely autonomous, the malaria program represents the largest demand on CDC's budget (about 40 per cent) and is considered the top priority program by the current director-general.

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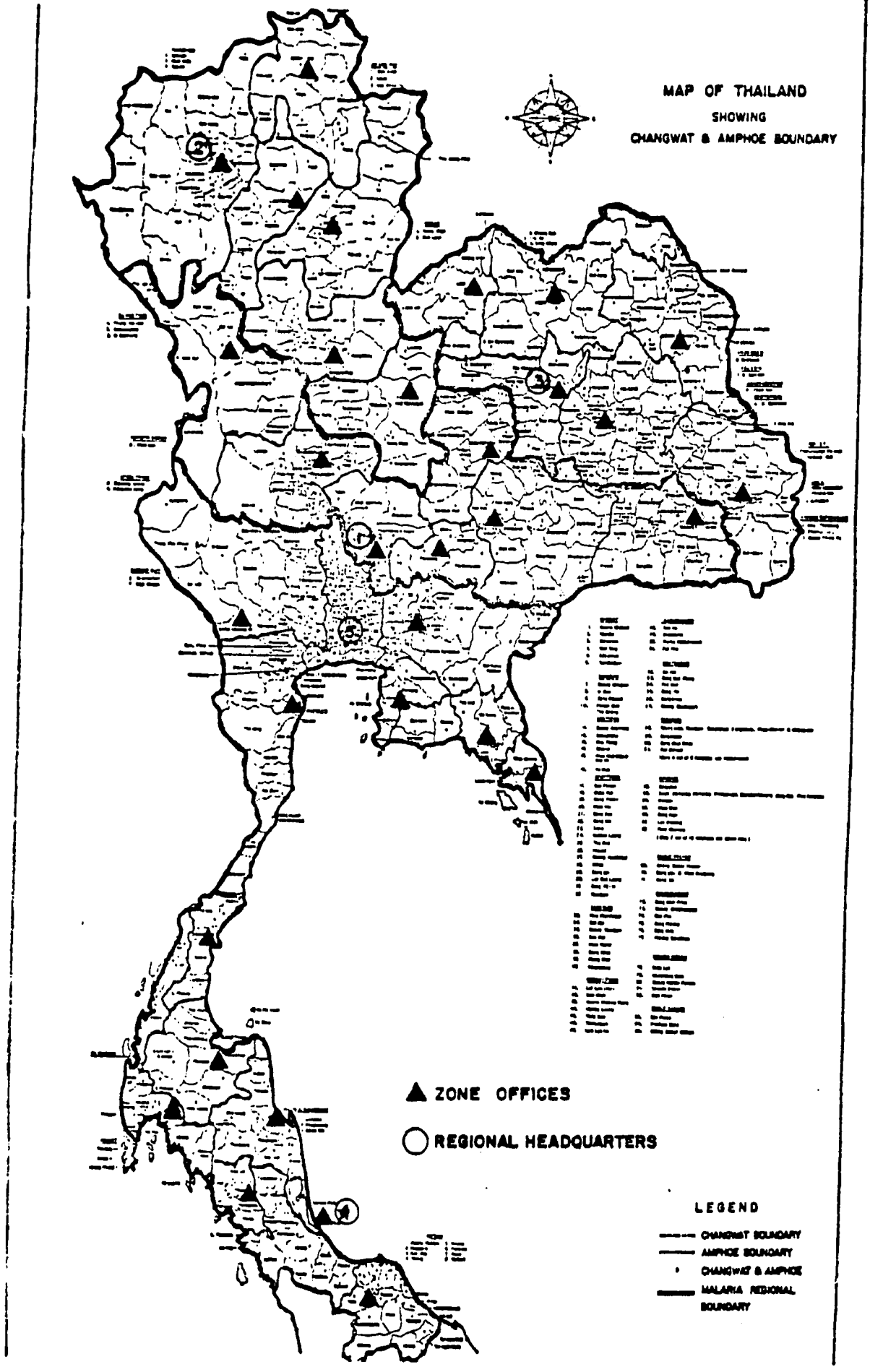
Figure IV-2


MAP OF THAILAND
SHOWING
CHANGWAT & AMPHOE BOUNDARY
ZONE OFFICES
REGIONAL HEADQUARTERS
LEGEND
CHANGWAT BOUNDARY
AMPHOE BOUNDARY
CHANGWAT & AMPHOE
MALARIA REGIONAL BOUNDARY

The anti-malaria program appears to be generally well organized and administered but it has certain administrative problems which should be addressed in order to improve the program's effectiveness. Basic administrative constraints include personnel shortages, lack of adequate operating funds, and transportation constraints. These constraints contribute to supervision problems, difficulties in training and follow-up, and general difficulties in conducting field activities at a level high enough to have a maximum beneficial effect.

b. Personnel

Personnel shortages are chronic within the Malaria Division. In 1978, there were 256 vacancies out of a total authorized staff of 898 civil service employees (See Annex I). Although most of these vacancies are at sub-professional levels and represent temporary turnover, a good many positions including 11 Doctors, 7 administrative/financial officers, 24 malaria line officers and 4 medical science officers, (46 in all) are professional level positions which require substantial expertise. These 46 positions should be filled as soon as possible.

Since many of these positions are in shortage categories, especially the doctors, a critical appraisal of the level of expertise actually needed for these positions may reveal that qualifications could be downgraded in some instances. In some cases supplementary training might be substituted for academic credentials. The Malaria Division is currently reviewing its personnel needs and is discussing possible revisions of its personnel policies in an attempt to remedy its staffing problems.

At lower levels rapid staff turnover is very common. Junior malaria personnel often perceive better opportunities for earning more money as health workers with the public health service or private clinics. This is so because the public health service staff personnel often have a private practice where a fee is traditionally charged for services and drugs. Malaria workers do not have access to such fees since anti-malaria services including drugs have always been free to the public and malaria control activities are rather specialized. There is no easy answer to the staff turnover problem, but it is interesting to note that many malaria field personnel have been with the program for many years, and that most sector chiefs and many zone chiefs are former spraymen. The Malaria Division's commendable policy of promoting personnel from within its own ranks has undoubtedly enabled it to hold on to many of its best people and this policy should be continued.

c. Operating Budget

As one of the main constraints to malaria control has been inadequate funds budgeted for field operations, this project calls for a substantial annual expansion of the operational budget over the three year life of the project beginning in FY-79. Priority on these funds will be given to sectors with control areas.

In the past this category of expenditure, which covers per diem for malaria workers, vehicle repair and maintenance, communications and office supplies, petroleum, medical supplies including drugs, and other supplies has increased by only 5% annually which means that it has been decreasing in real terms. A substantial annual increase will bring the level up to 17.2 million baht by 1981. This amount should provide for an orderly increase in field operations in control areas, especially since one of the most costly components financed under the "Miscellaneous Expenditures" line item has been automobile maintenance expenditures which should be reduced significantly after the major overhauls are accomplished under this project.

The above budget increase will especially contribute to the capability of sector personnel to recruit and supervise volunteer collaborators in the villages, and to allow more frequent supervision of zone staff by regional personnel. It will also allow for more communication between health centers and malaria staff, thus facilitating closer cooperation. As figure 2 indicates, an adequate budget is certainly a necessary, if not sufficient, condition for improving malaria control services.

d. Lack of Transportation

The vehicle constraint detracts from effective program administration, and several project components are directed at relieving this problem. (See Detailed Description).

e. Volunteers

The effectiveness of the volunteer program has varied markedly throughout the country. The program seems most effective in areas of high malaria endemicity, and especially in the northern part of the country where volunteerism of all types is an established part of the culture. It is an accepted way to develop "merit" according to Buddhist precepts. In other areas, particularly in the south, the program has not been as successful and must be supplemented with mobile teams of malaria workers.

One weakness in the volunteer program is that little incentive exists for doing a good job. The main compensation is free health care given to certain volunteers (i.e. collaborators). There is also an annual award given by the King to outstanding volunteers but only a few persons receive the award each year. Certificates are given to volunteers after they complete a one-day training course, and longevity awards are also given. However, these rewards to not serve as incentives for good performance, and the lack of follow-up meetings and refresher training tends to aggravate the problem.

This project will address the incentive and follow-up problems by financing annual refresher training to the volunteers on a pilot basis. The training will stress motivating the volunteers. It is planned that high level provincial officials will publicly acknowledge good performance by outstanding volunteers at the meetings. Radio publicity also will be sought for them. During the training sessions various problems of the volunteers will be discussed and, whenever possible, corrective action will be taken on the spot.

f. Integration

Although the Malaria Division is a part of the Department of Communicable Disease Control, little integration has taken place between the AMP and other health care activities. Effective integration of the health services and AMP could result in a significant savings to the national budget. However, after thoroughly reviewing the status of both the AMP and primary health care situation in Thailand, members of the PP development team generally concur that significantly more integration between the Malaria Division and the public health service at this time is not feasible. Previous attempts at integration in eradication areas have met with failure. Even in Lampang Province where the primary health care initiative in Thailand began on a large scale, integration has been strongly resisted at several levels. Additional analysis of alternative approaches is needed before further steps toward integration can prudently be taken, and during the next three years it is hoped that a clearer idea will be developed of appropriate future integration strategy.

In the meantime, under this project, partial integration and continued cooperation will be encouraged between the Malaria Division and Public Health Service. Blood slide submission from the health service is expected to increase and a work plan for an appropriate level of integration will be developed. Meetings on the malaria problem between AMP and Health Service personnel may be especially useful in fostering mutual understanding and will be encouraged at all levels.

3. Conclusion

The project is administratively feasible as proposed and, since it addresses key administrative constraints, the project should bring about a stronger anti-malaria organization.

4. Monitoring Arrangements

a. RTG

The RTG has appointed a project committee with representation from the Malaria Division, Ministry of Finance, Bureau of the Budget, National Economic and Social Development Board and the Department of Technical and Economic Cooperation. The Director of the Department of Communicable Disease Control will chair the committee.

b. AID

An AID Mission project committee has been appointed to monitor the project. The committee has representatives from USAID's Office of Finance, Office of Program Policy and Evaluation, and Office of Project Development and Support. Chairperson of the Committee is from USAID's Office of Population, Health and Nutrition. In addition, the regional malarialogist will provide technical backstopping when necessary, and two locally-hired field monitors with substantial malaria program experience will monitor project activities on a full-time basis. These arrangements are considered acceptable for monitoring the project especially in view of the limited safeguards needed with DDT and the substantial experience that the RTG has with malaria projects.

C. AFRIMS (Armed Forces Research Institute for Medical Science)

AFRIMS, located in Bangkok, Thailand, and under the administrative control of the Department of Defense, will participate with AID in certain project activities. The extent of AFRIMS' participation has been negotiated and is fully explained in a Memorandum of Information and Understanding, 5 February 1979, which appears as Annex N of this Project Paper.

B. Implementation Plan

Annex C. is a grant Chart showing the approximate time frame for each of the major components of the project.

It is expected that the project will be authorized by April, 1979, and the agreement signed by July, 1979. In order to expedite the project, consultants for training and vehicle maintenance will be lined up before the agreement is signed so that their contracts can be executed as soon as possible thereafter. Similarly, scopes of work for the health education consultants will be prepared in advance and readied for advertisement directly after execution of the project agreement. Training participants will also be selected in advance of agreement execution.

All project assistance is expected to be completed by July, 1982, which is the planned PACD, assuming the agreement is signed by July, 1979.

C. Financial Arrangements

Several different financial mechanisms will be used to disburse funds for the project.

(1) Offshore Procurement - AID plans to establish direct letters of commitment under the loan with offshore suppliers of microscope and lab equipment; spray equipment; and vehicle maintenance tools. All offshore technical assistance and contract services are expected to be financed under the grant with PIOs. Loan financed participant training is planned using the PIO mechanism.

(2) Motorcycle Fund - AID will advance dollars under the loan which will be converted to Baht at the prevailing rate for establishing the fund for purchasing motorcycles. The advance will be made when the relevant conditions precedent on procedures and a lending mechanism have been established.

(3) Training - Funds will be advanced on a quarterly basis per training plans submitted in satisfaction of the conditions precedent. Expenditures will be accounted for through the submission by the Malaria Division of no-pay vouchers. Expenditure short-falls, if any, will be deducted from the next quarterly advance.

(4) Construction - Construction of training and laboratory facilities will also be FAR financed. However, due to the significant capital outlay required for constructing new training facilities AID will consider providing an advance of funds not to exceed 50%, when an acceptable contract has been executed for the construction.

(5) Research - AID will follow the same system established by WHO in financing research, i.e., a separate account will be established under the control of the Director, Malaria Division, with Baht equivalent of $100,000 advanced from the Loan. As the account is drawn down, receipts will be provided to AID for reimbursing the account until earmarked funds are used up.

(6) Overhauls - It is planned to reimburse the RTG 100 percent of the estimated costs excluding taxes, for each vehicle given a complete overhaul under the project. AID will utilize an actual cost reimbursement system to finance the cost of the overhauls which it has been estimated will average $1,000 each. Advances may be given if cash flow constraints so require.

D. Procurement Arrangements

The Malaria Division has no office of procurement per se and in the past offshore procurement has been handled through adhoc arrangements or through donor procurement. During the project development process this problem was addressed and an IFB has been prepared in draft using available expertise. It will be ready for distribution as soon as the project agreement is signed. The CDC will assign a person from the department to be responsible for procurement. The AID Mission will provide guidance in offshore procurement and ensure compliance with Handbook XI requirements.

(IFB:Invitation For Bid)

The project will set-up a revolving fund for purchasing motorcycles in Thailand. It is expected that tenured sector workers will draw upon the fund for purchasing light motorcycles available in the local market. Since virtually all locally available motorcycles are at least 70 percent locally produced (per a 1977 Regulation of the Ministry of Industry) the procurement would be local source-origin. An FAA Section 636(I) waiver is accordingly needed and hereby requested for the procurement of non-U.S. source origin motorcycles through the revolving fund mechanism.

Approximately 400 light (approximately 100 cc) motorcycles are expected to be initially financed with the revolving fund of $320,000 and reflows will finance many more motorcycles subsequently. The revolving fund mechanism is considered important to the institutional development of the Malaria Division and off shore U.S. procurement is not suitable for this mechanism. Further, motorcycles made in the U.S. are not appropriate for the project because they are larger than desired and have a relatively high initial cost and cost more to operate than locally available cycles. Also, spare parts and repair facilities for U.S. cycles are not available in rural Thailand where the cycles will be used. Finally, Notification No. 86, dated January 31, 1978 of the Ministry of Commerce places motorcycles on the list of prohibited imports, thus effectively restricting motorcycle procurement to Thai source-origin unless a special waiver were obtained.

Firm guidelines for the use of the revolving fund to purchase motorcycles, as well as an administrative mechanism to handle the funds, will be required as a Condition Precedent for advancing the money for the revolving fund.

Procurement of Hudson sprayers and Spray Systems spray nozzles without formal competition is requested. All back-pack sprayers currently being used by the Malaria Division (approximately 5,300) are manufactured by Hudson and are compatible in design to the sprayers proposed for purchase under the loan; and, in order to assure interchangeability and standardization of equipment the Malaria Division is requesting Hudson sprayers. Spray Systems is the only known

manufacturer of quality spray nozzles in Code 941 countries. Since the carrier used in the DDT spray operation is particularly abrasive, it is necessary to have extremely hard steel spray tips in order to minimize wear and insure an economical application of insecticide over a long period of time. Procurement of these items through negotiations with the suppliers will permit continued use of a standard design and allow for interchangeability of parts. It will also facilitate rapid procurement and insure use of the equipment in the 1980 spray season. Both of these items meet the waiver requirements as outlined in Handbook 15, Section 3-C-4 and Handbook 11, Section 3-C-9.

E. Evaluation Arrangements

1 Data Collection - Since this project is closely related to the World Health Organization's ongoing Malaria project, it will be possible to take advantage of WHO's elaborate survey and evaluation system for baseline and ongoing data collection. Included in WHO's system is the collection of information on control measures (using index villages), case detection measures, persisting transmission, accuracy of laboratory services, health, education and training.

Certain elements of this project involve initiatives and new approaches to old problems and will thus require new arrangements for the collection of operational and evaluative data. These activities include public health education, vehicle maintenance and administration, and improvement of the operational capability of field workers.

The compilation of data will be carried on throughout the project by those responsible for individual project components and will be the basis for quarterly reviews, annual internal evaluations and special in depth external evaluations.

2 Timing - The first major evaluation of this project is planned for September, 1980. It will use external expertise. The evaluation is planned for this date in order to allow sufficient time to provide some concrete results which in turn can be used as a contribution to the RTG's formulation of the fifth Five Year Plan (1982-1986) strategy and program for malaria.

WHO's special external evaluation will be held in 1979, much too early to permit a combined effort with USAID that would reveal the special effectiveness (or lack thereof) of this project's initiatives.

A subsequent USAID-RTG internal evaluation will be held in 1981. A final end-of-project in depth evaluation will take place in 1982. A total of $40,000 is budgetted to handle the two external evaluations.

Representatives of the Royal Thai Government will be equal participants in both external and internal evaluations. We view this as important in any project, but especially so in this case because of the potential for immediate subsequent RTG policy and planning adjustments.

In addition to the above evaluation arrangements the AID/RTG project committees will meet no less often than once quarterly to review the status of the project, and to recommend corrective actions if needed.

F. Conditions Precedent, Covenants and Negotiating Status

This project has been collaboratively developed with the Royal Thai Government and many of the items discussed herein are already reflected in the Malaria Division's budget. The following illustrative program-specific conditions precedent and covenants have been discussed with appropriate RTG authorities. Although it is understood that the Government is generally in accord with these, the final texts cannot be determined until the project agreement has been negotiated. It is expected, however, that no major negotiation problems will remain to delay execution of the project agreement once the funds have been authorized. Conditions precedent do not pertain to grant funded contract services.

1. Section 5.1 Conditions Precedent to Initial Disbursement

Prior to the first disbursement of the assistance or to the issuance by AID of documentation pursuant to which disbursement will be made hereunder, the government will, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

(a) An opinion of counsel acceptable to AID that this agreement has been duly authorized and/or ratified by, and executed on behalf of the government, and that it constitutes a valid and legally binding obligation of the government in accordance with all of its terms.

(b) A statement of the names of the persons, in addition to the person specified in Section 9.2 designated as representatives of the government for purposes of the agreement, together with a specimen signature of each specified in such statement.

2. Section 3.2. First Disbursement After Commencement of Each Fiscal Year of the Project

Prior to disbursement of assistance, or to the issuance by AID of documentation pursuant to which disbursement will be made after the commencement of each fiscal year of the Government during the life of the Project, the Government will, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID:

(a) An implementation plan for the current fiscal year approved by the Government and the World Health Organization (WHO) which includes both the components of the AID-financed project and that of the Peace Corps for that year.

(b) Evidence that all prior annual implementation plans are being carried out.

(c) Evidence that the Government's Malaria Division has increased its operating budget by an amount sufficient to insure that all on-going commitments as well as all operations and supplies in support of the project have been adequately provided for in the budget.

(d) Evidence that adequate measures are being taken to fill personnel vacancies.

(e) Evidence that the Government will procure a minimum of 15 motor vehicles during the current fiscal year.

(f) Evidence that adequate travel allowances are being provided for Malaria workers who utilize private motorcycles.

(g) Evidence that quarterly project review meetings have been scheduled and held jointly between the Government and AID and that recommended changes (if any) have been instituted.

(h) An evaluation plan for the current fiscal year.

3. Section 5.3. First Disbursement for Procurement of Goods and Services.

Prior to the first disbursement of assistance for procurement of goods and services or to the issuance by AID of documentation pursuant to which disbursement will be made for such procurement, the Government shall, except as the parties may otherwise agree in writing, furnish AID in form and substance satisfactory to AID a procurement plan which includes cost estimates, purchase and delivery schedules, adequate maintenance procedures and the proposed utilization of the goods and services.

4. Section 5.4. Training Activities Within Thailand.

Prior to commencement of any in-country training activities for which reimbursement will be requested hereunder, the Government shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID a comprehensive training plan which includes cost estimates, instructors and materials to be used, outlines of courses and accommodations for students.

5. Section 5.5. Participant and Third Country Training.

Prior to the first disbursement of assistance for participant training or to the issuance by AID of documentation pursuant to which disbursement will be made for such training, the Government shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID a comprehensive participant training plan which includes a description of the academic and short term training to be carried out in the United States and the short term training to be carried out in countries other than Thailand and the United States.

6. Section 5.6. First Disbursement for Research.

Prior to the first disbursement of assistance for research or to the issuance by AID of documentation pursuant to which disbursement will be made for such research, the Government shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, a comprehensive plan which includes deliniation of the role of WHO and Armed Forces Research Institute of Medical Sciences (AFRIMS) in formulating and monitoring research activities.

7. Section 5.7. Vehicle Overhauls.

Prior to the commencement of any vehicle overhauls for which reimbursement will be requested hereunder, the Government shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, a list of the vehicles to be overhauled with their identification numbers, a schedule for the overhauls, cost estimates which specify the parts to be used and evidence that the vehicles following overhaul will be properly maintained.

8. Section 5.8. Motorcycle Purchase Fund.

Prior to disbursement of assistance for establishment of a motorcycle purchase fund or to the issuance by AID of documentation pursuant to which disbursement will be made for such purpose, the Government shall, except as the parties may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, a comprehensive plan for administering the fund which includes procedures for loaning and repayment of the funds and maintenance of complete records of all transactions involved with the administration of the fund.

9. Section 5.9. Condition Precedent to Commencing Construction Activities.

Prior to the commencement of any construction activities for which reimbursement will be sought under the loan, in addition to the initial conditions precedent having been fully satisfied, the Borrower shall, except as AID may otherwise agree in writing, furnish to AID in form and substance satisfactory to AID, detailed plans of all construction to be carried out under the project to include locations, design specifications, contracting arrangements, and firm cost estimates. The MOPH's Construction Division and the USAID engineer have reviewed the preliminary cost estimates and, based on current prices, they believe the project cost estimates to be accurate.

10. Special Covenants

a. Section 6.1. Malaria Control Action.

The Government covenants that throughout the life of the project it will carry out on a regular basis effective spraying and surveillance operations in those areas of malariogenic potential as described in Section 2.1 of the Project Agreement.

b. Section 6.2. Equipment Maintenance.

The Government covenants that it will establish and maintain a maintenance system for all vehicles, equipment and other property used in project implementation to assure that such items remain in satisfactory operating condition throughout the life of the project.

c. Section 6.3. Safety Measures for Handlers of Insecticides.

The Government covenants that throughout the life of the project it will provide adequate procedures, equipment and training for the safety of persons engaged in the handling of insecticides to minimize their exposure to the dangers associated with the handling of insecticides.

d. Section 6.4. Quality Control. The Government covenants that throughout the life of the project it will maintain rigid control over the quality of insecticides procured for the project to assure that they meet the technical specifications of WHO and AID.

e. Section 6.5. Compliance with Annual Plans of Action.

The Government covenants that throughout the life of the project it will comply with the annual plans of action (implementation plans) referred to in Section 5.2 of the project agreement with such modifications as may be agreed upon by WHO and AID.

f. Section 6.6. Reports.

The Government covenants that throughout the life of the project it will provide AID with periodic reports as requested on procurement, shipping and project implementation as well as such other matters relating to the project as AID may from time to time request.

g. Section 6.7. Project Evaluation.

(1) The parties agree to establish an evaluation program as part of the project. Except as the parties may otherwise agree in writing, the program will include, during the implementation of the project and at one or more points thereafter: (a) Evaluation of progress towards attainment of the objectives of the project; (b) Identification and evaluation of problem areas or constraints which may inhibit such attainment; (c) Assessment of how such information may be used to help overcome such problems; and (d) Evaluation, to the degree feasible, of the overall development impact of the project.

(2) The Government further agrees to hold quarterly review meetings beginning no later than six months following the execution of this agreement. Project committee members including AID representatives will be invited to participate in the reviews, and provincial officials responsible for project implementation will also attend.

Anti-Malaria Project

Annexes

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ANNEX A - PID APPROVAL CABLE

NNNNVV MJA270MJB024EHE419
RR RUMJ0M
DE RUEHC 5721/1 2031223
ZNR UUUUU ZZH
R 220048Z JUL 78
FM SECSTATE WASHDC
TO RUMJQB/AMEMBASSY BANGKOK 7641
INFO RUMJGM/AMEMBASSY COLOMBO 7162
BT

24/1230 JUL 78

ACTION: AID

INFO: AMB
DCM
ECON
CHRON

UNCLAS SECTION 1 OF 2 STATE 185721/1

AIDAC, COLOMBO FOR REGIONAL MALARIA ADVISOR

E.O. 11652: N/A

TAGS:

SUBJECT: PID FOR MALARIA AND VECTOR CONTROL (493-0305) RESULTS OF APAC CONSIDERATION

AT JULY 14 MEETING, APAC APPROVED PID FOR SUBJECT PROJECT AND DEVELOPMENT OF FINAL PROJECT DESIGN AS FY 80 SHELF ITEM. FOLLOWING ISSUES/POINTS SHOULD BE CONSIDERED DURING FINAL DESIGN AND TREATED APPROPRIATELY IN PROJECT PAPER (PP):

(A) PROJECT SCOPE. PID NOTES ON PAGE 4 THAT QTE THE MALARIA PROGRAM WILL BE CONCENTRATING ITS ACTIVITIES ON AREAS OF HIGH RISK IN WHICH APPROXIMATELY 8.7 MILLION LIVE UNQTE. QUESTION RAISED AS TOWHETHER OVERALL POPULATION AT RISK MAY NOT INCLUDE UP TO 15 MILLION. CAN EFFECTIVE PROGRAM BE MOUNTED WITH TARGET POPULATION OF ONLY 8.7 MILLION PEOPLE? WHAT ARE RTG PLANS VIS-A-VIS MALARIAL AREAS IN REST OF COUNTRY NOT COVERED BY 8.7 MILLION FIGURE?

(B) RTG COMMITMENT. PP MUST INCLUDE DATA ON RTG BUDGET AND OTHER APPROPRIATE COMMITMENT TO PROGRAM BOTH DURING LIFE OF PROJECT AND SUBSEQUENTLY TO ENSURE GAINS MAINTAINED AND TO PROVIDE FOR CONTINUING CONTROL AS NECESSARY. TO EXTENT POSSIBLE RTG COMMITMENTS SHOULD BE CAST IN FORM OF CONDITIONS PRECEDENT TO PROJECT FINANCING.

(C) COORDINATION MALARIA AND OTHER VECTOR CONTROL ACTIVITIES. APAC NOTES THAT WITHIN THE RTG MINISTRY OF HEALTH RESPONSIBILITY FOR ANTI-MALARIA EFFORTS IS UNDER DEPARTMENT OF HEALTH WHILE RESPONSIBILITY FOR VECTOR CONTROL IS UNDER DEPARTMENT OF MEDICAL SCIENCES. WHILE THE PLAN OF OPERATIONS SIGNED JANUARY 1978 MAY INCORPORATE ACTIVITIES OF BOTH DEPARTMENTS APAC RECOMMENDS PP INLCUDE SPECIFIC DESCRIPTION

OF COOPERATION NECESSARY ON OPERATIONAL LEVEL. FULL SCOPE OF VECTOR CONTROL ACTIVITIES TO BE INLCUDED UNDER THIS PROJECT, SUCH AS POSSIBILITY DENGUE FEVER CONTROL, SHOULD BE EXPLORED AND SET FORTH IN PP.

(D) TRAINING. APAC FOUND PID SECTIONS ON TRAINING UNCLEAR WITH REGARD TO SUBJECT MATTER AND RELATIONSHIPS TO ON-GOING TRAINING. QUESTION WAS RAISED AS TO WHETHER ENOUGH TRAINING IS BEING PLANNED OVERALL AND WHETHER BUDGET IS HIGH ENOUGH TO PROVIDE FOR TRAINING PROPOSED. FOR EXAMPLE, IT WAS NOTED THAT FOR QTE TRAINING AND SUPPORT UNQTE OF 20,000 MALARIA VILLAGES VOLUNTARY COMMUNICATORS (ON. 6 PAGE 5), BUDGET PROVIDES ONLY 20,000 DOLLARS OR ONE DOLLAR PER PERSON. TRAINING NEEDS, RESOURCES AND PROPOSED PROGRAMS SHOULD BE COVERED IN DETAIL IN PP. IN VIEW U.S. LEADERSHIP IN MALARIA AND VECTOR CONTROL METHODOLOGY, LIMITED U.S. TRAINING IS APPROPRIATE. HOWEVER, PLANS SHOULD INCLUDE MAXIMUM POSSIBLE USE OF REGIONAL MALARIA TRAINING CENTER NOW BEING EXPLORED BY AID/WHO TASK FORCE IN ADDITION TO HOST AND THIRD COUNTRY RESOURCES.

(E) RESEARCH. PP SHOULD OUTLINE MALARIA AND OTHER VECTOR CONTROL OPERATIONAL RESEARCH NEEDS OF THAILAND AND INDICATE HOW THE RESEARCH PROPOSED IN PID FITS IN WITH OTHER RELATED RESEARCH IN THAILAND TO BE FINANCED BY THE RTG, WHO AND OTHER SOURCES. FURTHER DESCRIPTION OF PROPOSED AID FINANCED RESEARCH AS PRESENTLY PLANNED SHOULD BE INCLUDED, RECOGNISING THAT FLEXIBILITY IS NECESSARY IN THIS AREA.

(F) ANTI-MALARIA DRUGS. SINCE DRUG RESISTANCE IS HIGHLY PREVALENT IN THAILAND, PLANS FOR DEALING WITH THIS PROBLEM SHOULD BE INCLUDED IN PP.

(G) VEHICLES. PROJECT STUDY SHOULD INLCUDE REVIEW PAST RECORD OF USE AND MAINTENANCE OF VEHICLES PROVIDED FOR MALARIA PROGRAM WITH INFO ON USE/MAINTENANCE PLANS FOR PROPOSED PROGRAM VEHICLES. AID NOT PREPARED FINANCE PROCUREMENT OF ANY NON-U.S. SOURCE/ORIGIN VEHICLES.

(H) ENVIRONMENTAL ASSESSMENT (EA). COUNTRY SPECIFIC NATURE OF THAILAND MALARIA PROGRAM WITH BOTH DIFFERING CONDITIONS AND ANTI-MALARIAL APPROACHES AND TECHNIQUES WILL REQUIRE INDIVIDUAL EA FOR THIS PROJECT. WE WILL EXPLORE POSSIBILITY OF PROVIDING SERVICES OF EUGENE GERBERG OR GENERAL ENVIRONMENTALIST RALPH LUKIN IN COORDINATION WITH MALARIA SPECIALIST FOR THIS PURPOSE WITHIN TIME FRAME NECESSARY OR PROPOSE OTHER CANDIDATE.

(I) AID STAFFING. APAC BELIEVES FINAL APPROVAL OF THIS PROJECT SHOULD DEPEND UPON ASSURED PRESENCE OF FULL-TIME MALARIA ADVISOR IN THAILAND. WHILE THIS ADVISOR MAY BE ABLE TO DEVOTE PART OF HIS TIME TO OTHER MALARIA ACTIVITIES IN EAST ASIA AFTER THIS PROJECT IS WELL UNDER IMPLEMENTATION, HE WILL HAVE TO SPEND FULL TIME WITH PRESENT PROJECT IN FIRST FEW YEARS. IDEALLY THE ADVISOR WOULD BE IN THAILAND DURING INTENSIVE PROJECT REVIEW AND FINAL DESIGN.

(J) PROJECT PREPARATION. SEARCH FOR PERSONNEL REQUIRED FOR FINAL PROJECT DESIGN AND PP WRITING SHOULD BEGIN ASAP. REQUEST USAID FORWARD JOB DESCRIPTIONS, SCHEDULES AND SCOPES OF WORK. SUGGEST MISSION CONSIDER MELVIN E. GRIFFITH WHO SERVED AS CHIEF MALARIOLOGIST IN THIALAND FROM 1950 THROUGH 60. FORWARDING BIO INFO SEPARATE COVER.

(K) PROJECT EVALUATIONS. IN ADDITION TO EXAMINING PROJECT IMPLEMENTATION/OPERATIONS, PLANNED EVALUATIONS SHOULD BE STRUCTURED TO EXAMINE THROUGHLY STEPS BEING TAKEN BY RTG TO ENSURE MAINTENANCE OF STRONG, EFFECTIVE PROGRAM PAST 1983 (SEE PARA B ABOVE).

(L) SPLIT RTG RESPONSIBILITY FOR GRANTS AND LOANS. RECOGNIZE THAT PROBLEMS CAUSED BY SPLIT WITHIN RTG OF RESPONSIBILITY FOR GRANTS AND LOANS IS GENERIC PROBLEM WHICH WILL NOT BE EASILY SOLVED, BUT BELIEVE THIS WOULD BE EXCELLENT PROJECT TO INVITE RTG TO RECONSIDER ITS POLICIES WITH VIEW TO GREATER UNIFICATION OF RESPONSIBILITY FOR SUCH SPLIT FUNDED PROJECTS.

(M) PROJECT AMOUNTS. GIVEN PROBLEMS POSED PREVIOUSLY BY QTE ODD UNQTE AMOUNTS FOR AID FINANCING (PARTICULARLY IN CASE OF RECENT RURAL PRIMARY HEALTH CARE EXPANSION PROJECT), BELIEVE AID FUNDING SHOULD BE ROUNDED TO NO LESS THAN 50,000 DOLLAR UNITS. THUS TOTAL AID FUNDING THIS CASE COULD BE 7,500,000 DOLLARS WITH 2,250,000 DOLLARS PROVIDED UNDER GRANT AND 5,250,000 DOLLARS UNDER LOAN. VANCE
BT
#5721

ANNEX B. PROJECT DESIGN SUMMARY - LOGICAL FRAMEWORK

PROJECT TITLE & NUMBER THAILAND ANTI-MALARIA PROJECT 493-0309

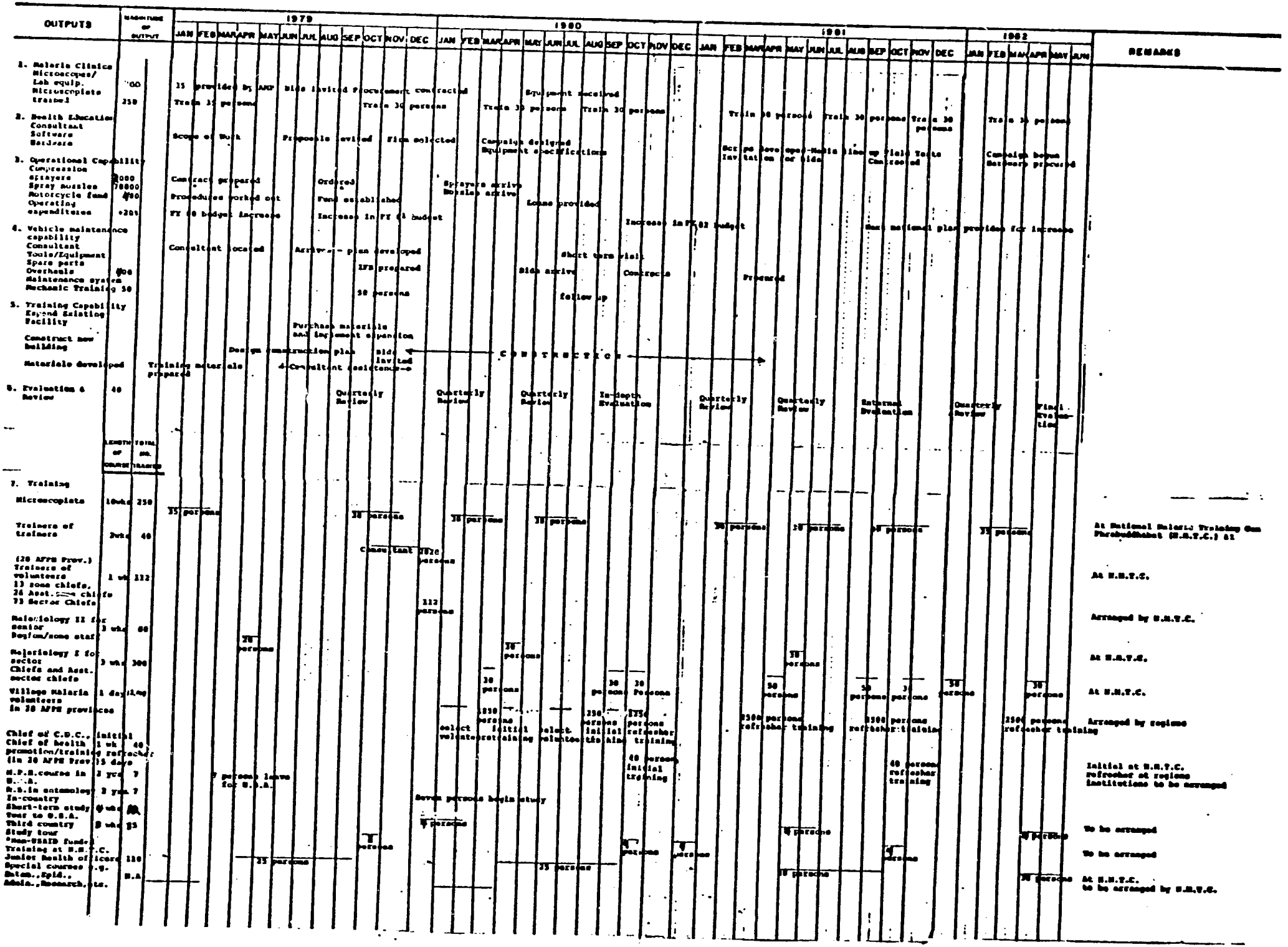
LIFE OF PROJECT:
FROM FY 79 TO FY 89
TOTAL US FUNDING US$ 4.0 MILLION
DATE PREPARED 12/78

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal The broader objective to which this project contributes: To improve the health status of the population of Thailand. Sub Goal: To maintain long term Malaria control of the border and mountainous regions covering approximately 8.7 million people and eradicate the disease in the remaining areas.	Measures of Goal Achievement: 1. Measurable significant reductions in general mortality and morbidity. Measures of Sub Goal Achievement: 1. Reduce malaria mortality by 50% of its 1977 level to approximately 5/100,000 population. 2. Malaria Eradicated in Eradication areas, no major outbreaks in control areas.	Evaluation of statistics from Thailand's Division of Vital Statistics, Ministry of Health and other health and national organizations in both the public and private sector.	Assumptions for Achieving Goal Targets: 1. Sustained economic growth to support national health service. 2. Continued RTG commitment to support its health service. 3. Continued support by WHO. 4. No major increase in insurgency.
Project Purpose: By 1982: Develop the institutional capability for providing to the rural inhabitants of Thailand's endemic Malaria areas of high risk, continuing Malaria control services for the foreseeable future at a level and quality sufficient to minimize occurrence of the disease and to provide timely and proper treatment to those who do contract the disease.	EOPS: 1. All essential Malaria program positions at professional level filled with qualified personnel. 2. All Malaria Teams at sector and zone level in control areas have adequate personnel, facilities, equipment, transportation support and funding, and are fulfilling operational and supervisory needs per approved plans of action. 3. Fifty percent increase in number of persons receiving immediate diagnosis and treatment at sector clinic's in control areas. 4. On-going operational research program targetted on priority problem areas. 5. Mortality rate of Malaria below 9 per 100,000. 6. Fifth National Development Plan provides for an adequate long range anti-malaria program. 7. Net increase of 50% in blood slide submission from health service (excluding malaria service) in 20 Accelerated Primary Health Care Province control areas. 8. Work plan for an appropriate level of integration of malaria program and other public health activities of the MOH.	1. Anti-malaria program (AMP) and MOH records. 2. WHO/AID/RTG evaluations. 3. Interviews with people within an operational area at evaluation points to corroborate project records. 4. Comprehensive plan of operations for malaria and vector control providing details as to policy budget staff and plans for continuing integration into national health services.	1. Timely RTG approval of annual operating budgets, staffing levels and policy support. 2. RTG health institutions will cooperate with and support AMP activities. 3. AMP operations are acceptable to local populations, both in concept and in implementation. 4. Statistical Reporting System remains the same. 5. Basic Health Services project continues according to plan.
Outputs: 1. Operating Malaria Clinics in strategic locations within priority malaria control areas. 2. Improved health education program. 3. Improved operational capability of field workers (adequate sprayers, transportation improvements, increased operational funding). 4. Improved vehicle maintenance capability. 5. Improved training capability. 6. Trained manpower in place. 7. Research facilities improved and planned research completed. 8. Evaluation.	Magnitude of Outputs: 1. 200 sectors in malaria control areas have clinics with personnel trained as microscopists, microscope and support equipment. 2. Revised health education plan adopted with acceptable plan of action and necessary supporting materials available. 3. a. 2,000 sprayers distributed to spray teams. b. 78,000 imported nozzles and spare parts used accordingly to plan. c. 400 motorcycles purchased under revolving fund. d. Minimum 20% annual increase in operating expenditures. e. 400 vehicles purchased. 4. a. AMP maintenance shops adequately equipped. b. Acceptable maintenance procedures in use. 5. a. National Training Center fully equipped with double 1977 training capacity. b. Regional Training Centers (5) adequately equipped. 6. a. Seven MPH's MS's trained in U.S. b. Twenty short term participants trained in U.S. c. Thirty-five short term participants trained in 3rd countries.	1. Annual reviews. 2. Participant training records. 3. Malaria and vector control program records and field visits.	1. a. RTG support for malaria and vector control program. b. Continued WHO assistance. c. AID and WHO technical assistance will be acceptable to RTG. 2. a. Personnel qualified to take training can be made available. b. Access to U.S. and Third Country training facilities. 3. Availability of required commodities on the world market at reasonable prices.

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
	d. Seven entomologists trained in country. e. Two hundred personnel trained as microscopists. f. 12,000 villages ... have trained community volunteers. g. Yearly refresher courses for volunteers carried out in all provinces. h. 500 National/Regional/Zonal AMP staff plus key RMO personnel given refresher training. i. 50 mechanics trained. 7. a. Central and Regional research labs improved. b. Ten operational research projects implemented. 8. Project evaluated.		
Inputs: RTG: 1. Funds and facilities for malaria and vector control operations over the life of the project. 2. Personnel for program. WHO: 1. Technical cooperation. 2. Commodities. 3. Training. 4. External assessment. 5. Pre research promotion. AID: 1. Technical Assistance. 2. Training. 3. Funds for Construction, commodities, revolving fund, research, etc. 4. Consultants. Peace Corps: 1. Six PCVs for Malaria program support.	Implementation Targets: (See detailed description and financial plans).	1. Yearly RTG budget. 2. Staffing lists. 3. National Planning documents WHO: Presence of WHO specialists and WHO documentation, both in Thailand and at the Regional Office in New Delhi. AID: 1. Project agreements. 2. Consultant reports.	

B-2

ANNEX C. IMPLEMENTATION PLAN GANTT CHART



Annex D - Summary of RTG Malaria and Vector Control Program 1977-81

THE PROJECT

The proposed project is designed for the 5 year period 1977-1981, conforming with the 4th 5 year National Development Plan. The responsible unit for the implementation of this proposed project will be a Malaria and Vector Control Administration to be built around the Malaria, Filariasis, and General Communicable Disease Control Divisions* of the Department of Communicable Disease Control, and the Division of Medical Entomology of the Department of Medical Sciences. The name of the project will be "Malaria and Vector Control". The director is to be appointed by the Ministry.

MALARIA

1. Justification

Malaria is widely distributed throughout Thailand. The disease is definitely increasing at an alarming rate. This has resulted from a relaxation of criteria and cut-backs in staff and supplies which have been necessitated because of insufficient funding of the programme over the past 4 years, and from many other ecological factors. Technical problems have also contributed to this situation such as the outdoor resting and biting habits of the major vectors, the resistance of falciparum malaria to the drug chloroquine, the increasing number of man made breeding places associated with industrial activities, and the increasing refusal rate and incomplete house spraying.

2. Programme Objectives

Long term control of the border and mountainous regions covering approximately 7 million population and eradication as an ultimate goal in the remaining areas.

3. Targets

3.1 Problem reduction

Reduce mortality rate by 50%. Since mortality due to malaria is directly related to timely adequate medical care, only 23% of

*DMF vector control program only

this reduction can be expected to result from this project and the remainder through the development of rural health services.

Reduce the annual parasite incidence, as a measure of morbidity in areas under surveillance, by 30%.

3.2 Coverage

	1977	1978	1979	1980	1981
Population covered by spraying operations.	7.70	7.89	8.12	8.33	8.54
Population under early attack to be radically treated.	0.02	0.03	0.02	0.02	0.01
Population under surveillance, to be radically treated.	0.46	0.51	0.46	0.41	0.36
Population protected by surveillance.	41.25	42.56	44.24	45.56	46.94
Population to receive presumptive treatment.	4.83	4.94	5.06	5.10	5.21
Houses to be sprayed.	1.54	1.58	1.62	1.67	1:71
	49.43	50.99			

4. Methodology

In early attack phase areas ~~malaria~~ Vector control will be by residual house spraying using DDT wettable powder in a dosage of 2 gm^s. per square meter, for all structures including farm huts, in order to reduce the vector population.

In late attack phase areas vector control will continue, but in addition active case detection and treatment (ACD), will be instituted using malaria project personnel for visiting every house on a monthly basis. Also the general health services and private sectors will be requested to carry out passive case detection and treatment (PCD) among the patients visiting the clinics.

In consolidation phase areas regular house spraying will be discontinued and the low level of malaria further reduced by ACD and PCD only. In addition case investigation by the malaria project personnel will result, in some instances, in insecticide spraying in order to control outbreaks.

In pre-integration areas ACD will be abolished in the inner zone around general health service institutes. The general health services will assume full responsibility for malaria within that zone, except that the malaria programme will carry out insecticide spray operations for outbreaks in the inner zone, when requested.

5. Plan of Action

Phase	Population in millions				
	1977	1978	1979	1980	1981
Attack					
Early	2.99	2.88	2.37	2.16	2.12
Late	4.01	4.31	5.01	5.41	5.64
Total	7.00	7.19	7.38	7.57	7.76
Consolidation	6.10	5.39	4.03	2.42	1.73
*Pre-integration	31.14	32.86	35.20	37.73	39.57
Total	44.24	45.44	46.61	47.72	49.06

* This target is contingent upon the adequate development of the planned rural health services.

6. Input

6.1 Manpower

6.1.1 Existing Personnel (1975)

Regular government employees	562	
Non regular government employees	1,889	
Temporary employees monthly pay	2,384	
Part-time temporary employees daily pay	4,524	(approx. 120 days per year)
Total	9,359	

6.1.2 Additional Personnel Required

	1977	1978	1979	1980	1981
Regular government employees	17	-	-	-	-
Non regular government employees	-	-	-	-	-
Temporary employees monthly pay	1,328	93	84	68	59
Part-time temporary employees daily-pay	500	150	150	150	150
Total	1,845	243	234	218	209

6.2 Supplies and Equipment

Item	Total	1977	1978	1979	1980	1981
Insecticide (DDT) in metric tons.	9,143	1,734	1,778	1,829	1,878	1,924
Anti-malarial drugs, in million tab.						
Fansidar	12.66	2.27	2.51	2.60	2.66	2.62
Chloroquine	141.11	26.96	27.80	28.31	28.68	29.36
Pyrimethamine	22.71	4.24	4.54	4.72	4.69	4.52
Primaquine	66.70	12.66	13.02	13.34	13.65	14.04
Quinine	.50	.10	.10	.10	.10	.10
Jeeps and Trucks	247	48	48	48	48	55
Motorcycles	291	60	60	60	60	51
Microscope & Lamp	106	90	-	-	8	8
Desk	60	44	-	-	8	8
Chair	106	90	-	-	8	8
Portable generator, ½ kilowatt.	15	10	5	-	-	-
Movie projector, 16 mm.-sound	5	5	-	-	-	-
Slide projector	5	5	-	-	-	-
Camera	5	5	-	-	-	-
Tape recorder	5	5	-	-	-	-
Amplifier sets	30	10	5	5	5	5

6.3 Financial Resources Required

	Total	1977	1978	1979	1980	1981
Million baht	1,116,931	205,706	212,985	222,465	232,312	243,463

6.4 Possible Foreign Assistance

Within the above financial resource requirements the formulation team has identified the following areas where foreign assistance would be beneficial:

1. Provision of supplies and equipment such as vehicles and microscopes amounting to approximately

	1977	1978	1979	1980	1981
US$	1,538,500	208,000	208,000	211,600	211,600

2. Training and Fellowships

	1976	1977	1978	1979	1980	1981
Training US$	10,300	35,850	56,300	20,255	20,255	20,255
Fellowships US$		28,000	14,000	14,000	21,000	28,000

3. Long term Advisory Staff approximately US$ 190,000 annually from 1977 - 1981.

4. Short term consultations.

	1976	1977	1978	1979	1980	1981
US$	6,000	23,000	2,000	2,000	2,000	2,000

5. Applied research

	1977	1978	1979	1980	1981
US$	5,800	5,300	300	300	300

7. Benefits of the Programme

7.1 Direct

It is estimated that over the entire five year period 1977-1981, this proposed project will result in 16,716 lives saved, which if the average age of death is 29 years would mean a savings of 518,196 working years valued at 4,645 million baht.

Over the same period 719,482 cases will be prevented, thus saving 10,792,230 working days valued at 249.2 million baht. In addition treatment costs amounting to 65.14 million baht and 14.39 million baht will be saved to the government and the individual, respectively.

7.2 Indirect

During the 8 year period 1965-1972, the estimated increase in export products in malarious areas protected by the programme, amounted to 6,335 million baht. Figures cannot be estimated for the future, but a reduction in cases and deaths would undoubtedly result in increased productivity in these areas. In addition there are numerous other indirect benefits, including education, which cannot be adequately measured.

7.3 Other diseases

This programme will also help protect the population, living in approximately 6 provinces, from filariasis carried by the anopheles mosquito. In addition a reduction in malaria cases will result in a reduction in deaths from some other diseases, which are complicated by malaria.

8. Follow up and Evaluation

Milestones have been set for this programme the achievement of which will be monitored monthly by a senior member of the HQ Staff, who will receive reports from the regional directors, analyse them, report to the programme director and coordinate appropriate remedial measures, as necessary.

The progress of the project activities will be evaluated annually by internal assessment and in 1979 and 1982 by external assessment.

9. Future Trends

The vector control operations in the attack phase areas will continue as previously stated, for some years.

If the measures outlined in this proposed programme successfully reduce the disease incidence to the target level then the same measures should be applied in the 5th 5 year planned period at the same level, to further reduce the disease incidence. The emphasis during future periods should be towards increased integration of the malaria activities into the general health services, assuming that these services continue to develop.

10. Programme areas

The two major aspects of the programme are malaria disease reduction and vector control. By the end of this 5 year period the vector control activities should be fully merged with the malaria activities under one administration, having completed the construction of necessary facilities and trained the necessary personnel.

ANNEX E - SUMMARY OF RTG/WHO PLAN OF OPERATIONS FOR MALARIA AND VECTOR CONTROL

1. Coverage

The project is aimed at covering the entire population.

The goal of the anti-malaria activities will be predominantly that of eventual eradication in most of the country but with long range control activities in the mountainous and international border areas, covering a population for the five years of about 7 million.

The control of the vectors of Dengue Haemorrhagic Fever will be concentrated in highly populated communities with high transmission rates, in every province in the country.

2. Methodology

The basic methodology and criteria outlined in the project Formulation Document "Malaria and Vector Control Program 1977-1981" will be followed, but with modifications as and when necessary in accordance with WHO recommendations. The Project formulation document should therefore be used as a reference in conjunction with this agreement.

With respect to the malaria project, this document is in sequence to the previous agreement of June 1965, in the document entitled "National Malaria Eradication Project Plan of Operations", reference to which will provide basic background information rationale, and eradication methodology and criteria utilized.

3. Existing Problems

The incidence of malaria in Thailand has been steadily increasing since 1972, mainly as a result of financial, administrative, technical and socio-economic difficulties. Consequently the existing malaria project has specific areas of need.

There is a shortage of professional personnel in the project, for instance there is no fully qualified and experienced national medical entomologist and there are only nine national physicians to cover the entire country. The gap in expertise, motivation and ability, between the MD and the next level of science graduate is extremely large. The prospects of recruiting additional physicians for the project are not very good, thus it is essential that the gap be closed by considerably

raising the standard of the science graduate. The analysis and correct interpretation of the true epidemiological situation, and the rapid implementation of remedial measures, demands a high level of professional capability and operational authority, as well as a reliable and rapid flow of relevant epidemiological data. Delays in the laboratory services and the epidemiological difficulties often result in delayed radical treatment, case investigation and focus identification.

The technical difficulties confronting the programme are, the widespread distribution of chloroquine resistant strains of P.falciparum, man made breeding of A.b.balabacensis in gem mining areas, the precise vector bionomics in southern Thailand and the most effective vector control methods to be used.

Considerable improvement is required in the passive case detection services especially in those areas where the vertical programme has been partly integrated into the provincial health services. Many of the peripheral health units are not screening all fever cases for malaria.

Among the administrative dificulties of the Project is the problem of inadequate supervision which is especially difficult in remote areas and in the field at night. There are already several in-built systems of supervision operating in the project, but these are often rendered ineffective by budgetary constraints.

The control of the vector of Dengue Haemorrhagic Fever has yet to be implemented throughout the country, in accordance with the project formulation proposals. To achieve the required standard of operations a cadre of competent personnel, well trained in entomology and management, will be required at the supervisory levels.

Objectives

A. The Government's Long Term Objectives

i) To maintain long term control of malaria in the border and mountainous regions of the country with malaria eradication as an ultimate goal in the remaining areas.

ii) To control the Aedes mosquito in an endeavour to reduce the chronic foci of Dengue Haemorragic Fever, to prevent outbreaks, and to suppress existing outbreaks of this disease.

B. The Government's Short and Medium Term Objectives

i) Problem reduction targets

a) To reduce the annual malaria parasite incidence by 30% between 1977 and 1981.

b) To reduce the annual mortality due to malaria by 50% between 1977 and 1981. The activities of the malaria project do not directly affect mortality, as this is related to timely and adequate medical treatment. The extent to which malaria mortality can be reduced by the malaria project activities is related to the reduction in the parasite incidence and is expected to be about 23%. The remaining 27% of the target reduction in malaria mortality will depend upon the successful development of the rural health services.

c) To reduce the morbidity due to Dengue Haemorrhagic Fever by 10% at the end of the first year, 20% at the end of the second year, 40% at the end of the third and 50% at the end of the fourth and fifth years.

d) To reduce the mortality rate due to Dengue Haemorrhagic Fever by 75%. However the programme alone can only expect to reduce this rate in so far as it relates to the reduction in the morbidity rate, which would be a 50% reduction only.

The Government/WHO Short and Medium Term Objectives

The activities of the WHO personnel assigned to this Government/WHO project will contribute to the achievement of the Government's objectives outlined in A and B above, many of which will extend beyond the proposed life span of this project.

The following objectives are the short and medium term objectives of this joint Government/WHO assisted project described herein, the achievement of which is the direct responsibility of the Government and the WHO.

1. To develop and demonstrate an entomological capacity sufficient for the long range needs of the malaria project by, providing six fully qualified medical entomologists at the headquarters and regional levels operating an adequate entomological support service, and an annual in service training course for twenty senior entomological workers.

2. To conduct applied research in entomology on the vectors, their bionomics, the strains and their response to control measures, particularly in southern Thailand, and to determine the most appropriate anti Vector measures to be used. This will involve the training of 18 field workers in specific research activities.

3. To monitor the susceptibility of the 8 presently recognized vectors and suspected vectors to insecticides, especially in areas where long term antivector measures are envisaged.

4. To develop and demonstrate an epidemiological capability to serve the needs of the malaria project, with particular emphasis on situation analysis and remedial measures, through appropriate post graduate training for 6 science graduates working at the head quarters and regional levels and through an annual in service training course in epidemiology for 20 senior malaria workers.

5. To review the organisation and function of the malaria epidemiological services and to develop an alternative system designed to increase efficiency and effectiveness, especially to reduce delays in reporting.

6. To keep appraised of the latest developments in the chemotherapy of chloroquine and other drug resistant P.falciparum, and to monitor the distribution and extent of the resistant strains of the parasite within the country, by training at least 8 senior level workers in testing techniques, and by covering 12 provinces each year.

7. To monitor malaria case detection and treatment activities carried out by the provincial health services throughout the country, but particularly in the integrated areas, and to take appropriate corrective action if the following criteria are not implemented:

i) blood smears to be taken from all fever cases attending clinics, in any case to be not less than 10-15% of the total attendance,

ii) blood smears to be taken from all fever cases and persons returning from malarious areas found during home visiting, in any case to be not less than 5% of the populations covered,

iii) presumptive treatment to be given to all cases from whom blood smears are taken.

iv) prompt radical treatment to be given to 100% of laboratory confirmed positive cases,

v) regular follow up of 100% of treated positive cases for one year.

The monitoring of these activities is to be constant through routine reporting and by spot check visits to at least 25% of all health units per year in every province.

8. To solve various specific technical and operational problems, for example the continuing transmission of malaria in gem-mining areas and to adopt alternative operational procedures.

9. To enhance the malaria laboratory services by recruiting and training an additional 106 microscopists at the rate of 20 per year, and to develop the vector control laboratories, sufficient to meet established national standards.

10. To conduct an external independent assessment of the malaria programme in August 1979 and additionally as required.

11. To develop and put into effect a comprehensive control system to ensure performance to standards within the malaria project.

12. To establish and demonstrate management and supervision at the regional and provincial levels in an entomological capacity for vector control activities through basic training for 56 entomologists, biologists, sanitarians, medical technicians or assistant medical technicians, and post graduate training for five entomologists.

13. To plan and implement the most economically effective malaria epidemiological surveillance activities in 100% of those cantons where malaria activities have been, or will be integrated into the provincial health services, and in the first instance to complete the mapping of 100% of the cantons in partial integration in malaria region III by December 1977.

ANNEX F-1

SUPPLEMENTARY FINANCIAL DETAILS

Average Overhaul Cost - Jeep Vehicles

Engine Overhaul

	Cost ₦	Cost $
1. Gasket set engine overhaul	250	12.50
2. Piston	1,000	50
3. Ring set	250	12.50
4. Valve, exhaust	800	40
5. Valve guide, exhaust	320	16
6. Valve guide, inlet	80	4
7. Main bearing	80	4
8. Connecting rod brg.	250	12.50
9. Bushing camshaft	120	6
10. Camshaft gear	30	1.50
11. Clutch plate	280	14
12. Clutch release bearing	600	30
13. Oil filter	60	3
14. Kit carburetor repair	60	3
15. Bushing clutch shaft	120	6
16. Hose radiator upper	15	.75
17. Hose radiator lower	60	3
18. Spark plug	80	4
19. Contact point	60	3
20. Condenser	30	1.50
21. Fan belt	30	1.50
22. Water pump assy	70	3.50
23. Oil tube inlet	400	20

24. Engine front support	100	5
25. Engine front outlet	130	6.5
26. Contractual services	120	6
27. Miscellaneous	300	15
Sub-Total	5,685	284.25

Overhaul Transmission

1. Kit, transmission repair	120	6
2. Kit, transfer case repair	120	6
3. Counter shaft	100	5
4. Counter shaft bearing	120	6
5. Main drive gear	1,200	60
6. Counter shaft gear	1,500	75
7. Gear second speed	500	25
8. Synchronizer	500	25
9. Intermediate shaft	150	7.5
10. Gear, intermediate	1,200	60
11. Bearing Intermediate gear	150	7.5
	5,600	280.6

Overhaul brake system			
1.	Kit, master pump repair	200	10
2.	Kit, front wheel brake repair	60	3
3.	Kit, rear wheel brake repair	60	3
4.	Oil seal front and rear	120	6
5.	Brake lining and brake lining	300	15
6.	Adjusting clutch	100	5
		840	42
Electrical System			
1.	Cutout regulator	250	12.5
2.	Bendix drive	300	15
3.	Armature Generator	600	30
4.	Armature Starting Motor	600	30
5.	Brush set (Gen. and motor)	60	3
6.	Bushing (gen. and motor)	50	2.5
7.	Coil	150	7.5
8.	Ignition cable	100	5
9.	Rear lamp assy	350	17.5
10.	Motor windshield wiper	300	15
11.	Dimmer switch	80	4
		2,840	142

Steering, Spring, and Rear Axle

1.	Kit connecting rod service	100	5
2.	Socket tie rod, left, right, and long	400	20
3.	Kit, knockle oil seal	120	6
4.	Shock absorber front and rear	600	30
5.	Kit, spring shackle front and rear	320	16
6.	Ring gear and pinion	2,500	125
		4,440	222
		19,400	970

National Training Center

1. Expansion of the Training Center

1.1 Construction of a 3 story building of approximately 1,800 square meters.

1.1.1 Ground floor will consist of one large meeting room with a seating capacity of approximately 120 people to be used for large training groups and meetings. Two smaller meeting rooms, one laboratory training room, and 8 offices for training staff will also be located on the ground floor.

1.1.2 The second floor will consist of dormitory living quarters for trainees and teaching staff (26 rooms). A kitchen and dining facility will also be provided for trainees since at present such facilities are not available at the center.

1.1.3 The building will be constructed of concrete with glass, windows, linoleum tile ground floor and wooden upper floor. Bathing and toilet facilities and full furnishings will also be included.

1.1.4 Current construction costs are estimated at $125 U..S. per square meter

Total area 1,800 sq. meters
Cost per square meter $125
Estimated cost of construction $225,000 U.S.

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Cost of furniture (beds, mattresses, pillows, bed linen, tables, chairs, cabinets, ceiling fans, air-conditioners in 17 rooms, kitchen facilities) (see detailed list) $77,219

Breakdown of Cost of Furniture

Item	Quantity	Cost @	Total Cost
Bed frame	48	$ 50	$ 2,400
Mattress	48	30	1,440
Blanket	48	15	720
Sheets	96	5	480
Pillow	48	3	144
Pillow Case	96	2.50	240
Desk Set (1 table and 2 chairs)	26	50	1,300
Ceiling fans (20 for trainees rooms, 6 for dining/canteen area)	26	30	780
Swivel fans	6	75	450
Central air unit for large meeting room	1	17,500	17,500
Chairs	300	15	4,500
Tables for meeting rooms	85	50	4,250
Adjustable swivel chairs w/backs for laboratory	40	20	800
Sofa and chairset for reception area	2	250	500
Filing cabinets (metal) (4 shelves	5	50	250
Desks chairs for training office	15	125	1,875
Exhaust fans (10")	8	50	400
Built in closets, drawers, mirrors	26	250	6,500
Lab counter w/built in sinks	1	250	250
Lab desks	20	50	1,000
Dining room tables	30	30	900
Kitchen counters w/built in sinks	2	250	500
Shelves for microscopes	8	5	40
			50,000

2. Improvement of Existing Training Buildings	
2.1 Repair of floors and toilet facilities in dormitory and training classroom	$ 5,000
2.2 Tables and chairs for dormitory, classroom and library	1,500
2.3 Air conditioners (25,000 BTU) for training office and library (4)	6,000
2.4 Replacement of electrical wiring and lines	1,250
2.5 Repair of screens and closets in dormitory rooms	500
2.6 Beds, mattresses, pillows, linen (20 sets)	2,000
2.7 Ceiling fans for dormitory rooms (10)	1,000
2.8 Repair roof and repainting of building	2,500
2.9 Shelved cabinets for library textbooks (4)	400
2.10 Filing cabinets for library (2)	100
	20,250
3. Training Equipment	
3.1 Microscopes (45) for training lab	45,000
3.2 Photostat machine (photo copier) (1)	2,000
3.3 Duplicating machine (automatic) (1)	1,200
3.4 Typewriter (Thai) (1)	700
3.5 Typewriter (English) (1)	700
3.6 Water coolers (5 gal. capacity) (3)	825
3.7 Refrigerator 9cubic ft. for training lab (1)	700
3.8 Text books for library (1 set)	1,000
	50,000

Total amount of expenditures for National Training Center

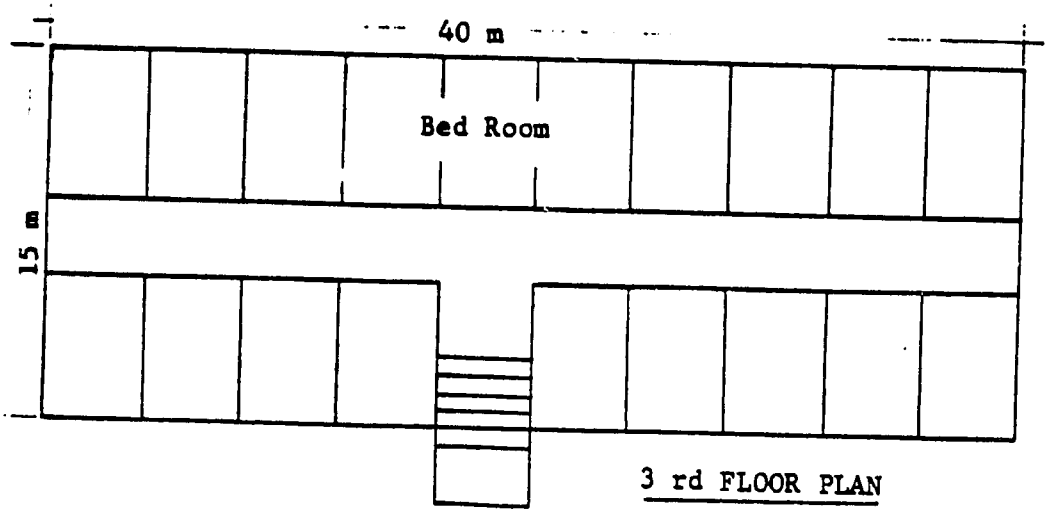
Construction Cost	$225,000
Furniture	77,219
Improve Existing Building	20,250
Training Equipment	50,000
Total	372,469

Health Education Hardware

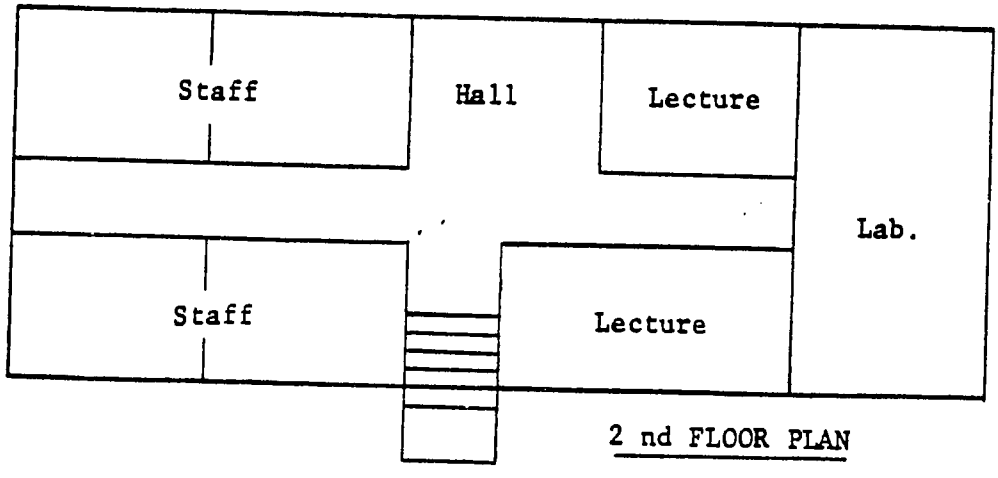
A. For 5 regional health education and training center and malaria division headquarters (6 sets)

	Item	Quantity	Cost ($)
1.	16 mm movie projector	6	12,000
2.	Automatic Slide projector	6	4,200
3.	Cassette tape synch recorder	6	2,000
4.	Overhead projector	6	3,000
5.	Slide and movie screen	6	600
6.	Amplifier - 100 watt	6	3,000
7.	PNR of loud speakers - 80 watt	6	3,000
8.	Microphone	12	1,200
9.	35 mm camera w/flash	6	2,400
		Total	31,800

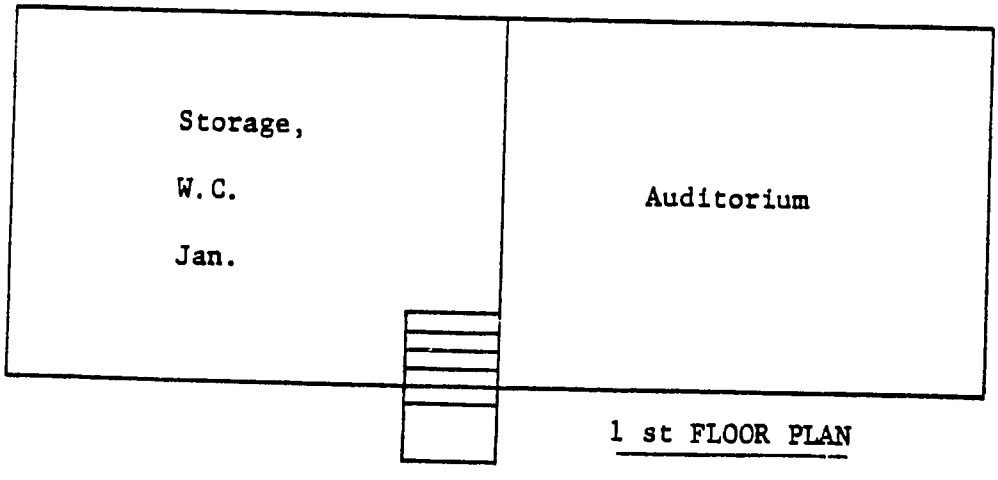
TRAINING CENTER - Phra Phutthabat



3 rd FLOOR PLAN



2 nd FLOOR PLAN



1 st FLOOR PLAN

Area of each floor 40 m x 15 m = 600 m2, construction cost $ 125 per m2.
Building cost $ 0.225 mil. + Furniture and Office Supplies $ 0.075 mil.
Total cost $ 0.300 mil.

MALARIA DIVISION

FISCAL YEAR	YEARLY BUDGET EXPENDITURE					UNIT: MILLIONS OF BAHT		
	NATIONAL	Ministry of Public Health	% of National	Dept. of Commun. Dis. Control	% of National	Malaria Div.	% of National	% of Dept.
1971	28,645	971.9	3.4	136.1	14.0	111.5	11.4	81.9
1972	29,000	950.3	3.3	107.8	11.3	85.7	9.0	79.5
1973	32.460	1,023.2	3.2	954.1	93.3	87.0	8.5	9.1
1974	39,028	1,113.6	2.9	1,032.4	92.7	72.1	6.4	7.0
	+250							
1975	50,250	1,533.4	3.1	253.9	16.6	117.0	7.6	46.8
1976	62,650	2,385.8	3.8	303.8	12.7	137.2	5.8	45.2
1977	68,690	3,422.0	5.0	336.0	9.0	142.6	4.2	42.4
1978	81,000	3,417.0	4.2	364.5	10.7	154.6	4.5	42.4
1979	92,000	3,982.6	4.3	407.3	10.2	167.8	4.2	41.2

Details of Budget Appropriation (in baht)

Expenditure Categories	1978	1979	Remark
Miscellaneous Expenses			
Rent	1,500,000	1,500,000	
Per diem (food, transportation and lodging)	6,830,000	10,270,800	
Repair of vehicles	1,000,000	2,000,000	
Other expenses: stamps, telephone, telegram, electricity, water supplies, publications	1,559,000	1,740,000	
Total	10,880,000	15,510,800	
Supplies			
Fuel & lubricating oil	6,848,000	9,768,000	
Medical supplies	7,820,000	12,742,000	
DDT	34,500,000	30,500,000	
Spareparts of vehicles	2,950,000	2,279,900	
Spraying operations, spareparts re-agents, chemicals	1,500,000	1,722,700	
Office supplies	2,000,000	2,000,000	
Other supplies	500,000	500,000	
Total	56,118,600	59,460,600	
Non-expendable Properties			
Small trucks	(14) 1,288,000	(29) 2,668,000	
Motor bikes	(30) 360,000	-	
Microscopes	(30) 360,000	(30) 360,000	
Sprayers	-	(210) 630,000	
Others	584,100	983,500	
	2,562,100	4,641,500	
Remuneration			
Overtime	200,000	200,000	
Rent for government official quarters	937,400	1,200,000	
Special teaching costs	15,000	15,000	
	1,152,400	1,415,000	

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group Engine				
1	810585	Gasket set, engine overhaul	set	300	200	60,000
2	801344	" " " "	"	300	100	30,000
3	928342	Valve exhaust	each	500	60	100,000
4	646421	Valve inlet	"	500	60	30,000
5	119137	Guide, valve stem, exhaust	"	500	15	7,500
6	119138	" " " 1 inlet	"	500	15	7,500
7	645595	Bushing camshaft	"	150	25	3,750
8	948137	Gear camshaft 56 teeth	"	150	250	37,500
9	639980	Gasket oil pan	"	150	10	1,500
10	647585	Tube oil filter inlet	"	50	60	3,000
11	910290	" " " outlet	"	50	40	2,000
12	638629	Insulator engine support front	"	300	60	18,000
13	800986	Oil seal inlet valve	"	1,000	2	2,000
14	A-6156	Insulator engine supportrear	"	50	120	6,000
15	802925	Ring gear flywheel 129 teeth	"	50	130	6,500
16	646698	Pulley crankshaft	"	50	120	6,000
17	918089	Block and bearing, with pistons fitted	set	30	20,000	600,000
18	649712	Head, cylinder	"	20	1,500	30,000
19	801538	Piston and pin .020 o.s.	each	200	1,000	200,000
20	801540	" " " .040 o.s.	"	200	1,000	200,000
21	919195	Ring set .020 o.s.	set	100	200	20,000
22	919197	" " .040 o.s.	"	100	200	20,000
23	909335	Oil filter element	each	100	60	6,000
24	9396407	" " "	"	300	80	24,000
25	119952	" " "	"	300	60	18,000
						1,439,250

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group Clutch				
1	919870	Plate and hub driven ¢8½"	set	100	500	50,000
2	921977	Plate and hub driven ¢9½"	"	200	500	100,000
3	930340	Pressure plate assy ¢9½"	"	50	600	30,000
4	635529	Bearing clutch release	each	200	50	10,000
5	630117	Spring retracting carrier	"	200	2	400
6	644366	Carrier, clutch release bearing	"	50	30	1,500
7	641275	Lever clutch control	"	50	50	2,500
8	910248	Lever and tube clutch control assy	R.M.D.	50	150	7,500
9	639578	Bushing clutch shaft	"	200	15	3,000
						204,900
		Group Fuel				
1	924160	Kit, carburetor repair	set	200	80	16,000
2	810636	Kit, vacuum and fuel pump repair	"	100	100	10,000
3	802040	Flexible connecting fuel line	each	100	30	3,000
4	923808	Carburetor assy	set	50	600	30,000
5	120206	Fuel pump assy	"	50	400	20,000
6	912017	" " "	"	30	350	10,500
7	914850	Fuel gauge tank	"	30	200	6,000
8	948697	" " "	"	30	200	6,000
9	926945	Connector, Flexible air cleanser	each	50	30	1,500
0	911895	Fuel tank CJ3B	set	30	1,000	30,000
1	937996	" " CJ5, 6	"	30	1,000	30,000
						163,000

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group Cooling System				
1	908028	Radiator assy CJ6	set	50	1,200	60,000
2	936621	" " CJ3B	"	50	1,200	60,000
3	648360	" cup	each	100	30	3,000
4	A6839	Kit, water pump repair	set	50	100	5,000
5	649844	Pump water assy	"	50	350	17,500
6	906778	Hose radiator outlet	each	50	60	3,000
7	906779	" " inlet	"	100	80	8,000
8	800284	" " " CJ3B	"	50	70	3,500
						160,000
		Group Electrical				
1	910997	Contact set	set	200	30	6,000
2	917128	Condenser	each	200	30	6,000
3	923392	Rotor	"	100	20	2,000
4	118343	Distributor cap	"	50	30	1,500
5	930456	Spark plug wire	set	50	90	4,500
6	804492	Spark plug	each	3,000	15	45,000
7	923130	Regulator 12V.	set	50	250	12,500
8	933160	Coil 12V.	"	100	120	12,000
9	GM-901203	Bearing drive end (gen.)	"	100	25	2,500

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
10	919286	Bearing commutator end (gen.)	"	150	10	1,500
11	919287	Armature generator 12V.	"	50	600	30,000
12	A-1395	Insulator generator support	each	200	5	1,000
13	925666	Armature starting motor 12V.	set	30	600	18,000
14	919294	Solenoid 12V.	"	100	70	7,000
15	A-1583	Bearing bronze assy.	each	300	10	3,000
16	931463	Bendix drive 12V.	set	100	250	25,000
17	803870	Dimmer switch	"	50	50	2,500
18	924789	Switch, lighting	"	30	120	3,600
19	647801	" , stop	"	30	25	750
20	924918	" ignition	"	50	150	7,500
21	914847	Plug heat indicator	"	50	70	3,500
22	916807	Switch, directional signal	"	50	350	17,500
23	938893	Light, tail and stop assy	"	200	200	40,000
24	GM-454645	Bulb 12V.	"	1,000	10	10,000
25	926595	Horn assy 12V.	"	50	200	10,000
26	919345	Cable battery ground	each	100	30	3,000
27	919337	" " positive	"	100	60	6,000
28	914846	Speedometer assy	set	30	900	27,000
29	647629	Fan, belt	each	100	60	6,000
30	923068	Distributor assy	set	30	750	22,500
31	643797	Tube and shaft speedometer assy	"	100	60	6,000
32	924885	Starting motor assy 12V.	"	20	1,800	36,000
						379,350

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group Transmission				
1	805693	Kit, transmission repair	set	100	100	10,000
2	923300	" , transmission repair	"	100	90	9,000
3	936448	Main, drive gear 16-30 teeth	each	30	1,000	30,000
4	643721	Bearing main drive gear	"	30	120	3,600
5	640391	Syncronizer unit and blocking ring assy		50	500	25,000
6	906197	Gear second, speed 22-30 teeth	each	50	350	17,500
7	643702	Gear counter shaft 35-26-19-14 teeth"		30	1,000	30,000
8	640412	Counter shaft	"	100	90	9,000
9	640777	Roller counter shaft bearing 88 pics"		3,000	2	6,000
10	809294	Roller bearing intermediate gear 48 pics	"	2,000	2	4,000
11	809297	Gear, main shaft 29 teeth	"	30	500	15,000
12	809293	Gear, intermediate	"	50	900	45,000
13	809292	Shaft intermediate	"	100	100	10,000
14	809296	Thrust washer intermediate gear	"	100	30	3,000
15	120751	Kit, transfer case seal	set	50	50	2,500
16	807767	Shaft, output	each	30	500	15,000
17	809291	Gear, output shaft	"	30	500	15,000
18	809290	Gear, sliding	"	30	400	12,000
19	640397	Ring, synchronizer blocking	"	100	30	3,000
20	642754	Case, transmission	"	30	800	24,000
21	809289	Case, transfer	"	30	800	24,000
22	640786	Roller, main shaft pilot bearing 14 pies		1,000	2	2,000
						314,600

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Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group front axle and steering				
1	938151	Oil seal front wheel hub	each	200	25	5,000
2	908226	Kit, steering knuckle oil seal	set	100	80	8,000
3	921317	Socket tie rod right	each	50	120	6,000
4	920535	" " " left	"	50	120	6,000
5	918257	" " " middle for R.H.D.	"	50	150	12,500
6	805123	Kit, steering gear cross shaft and lever		30	400	12,000
7	52940	Cone and roller king pin brg.	each	1,000	30	30,000
8	52941	Cup king pin brg.	"	1,000	30	30,000
9	925446	Cone and roller front wheel bearing	"	100	40	4,000
10	925447	Cup front wheel brg.	"	100	40	4,000
11	647136	Arm steering R.H.D.	"	30	150	4,500
12	647246	Bearing bell crank shaft	"	200	20	4,000
13	923418	Kit, steering connecting rod	set	100	80	8,000
14	910656	Arm upper steering bell crank	each	30	300	9,000
15	910657	Arm and shaft lower steering	"	30	500	15,000
16	647247	Seal bell crank	"	200	10	2,000
17	936166	Kit, drive gear and pinion (5.38:1)	set	30	1,800	54,000
						214,000

Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group rear axle				
1	914802	Retainer grease	each	200	30	6,000
2	802568	Kit, drivegear and pinion (5.38:1)	set	50	2,000	100,000
3	916361	Kit, differential	"	30	400	12,000
4	936686	Kit, universal joint	"	500	120	30,000
5	639265	Oil seal differential	each	200	25	7,000
6	640959	Oil seal axle shaft carrier end	"	200	20	4,000
7	52799	Cone and Roller axle shaft brg.	"	100	60	6,000
8	52800	Cup axle shaft brg.	"	100	50	5,000
						170,000
		Group Brake				
1	805654	Kit, master pump repair	set	100	60	6,000
2	946919	" " " "	"	100	100	10,000
3	115962	Kit, front wheel brake cyliner repair ¢1"	"	200	25	5,000
4	A-6133	" , rear " " " repair ¢	"	100	25	2,500
5	807155	" , front " " " repair ¢	"	100	25	2,500
6	944363	" , rear " " " repair ¢	"	100	25	2,500
7	991525	Brake lining with shoe	"	100	600	60,000
						88,500

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Spare Part of Jeep CJ3B, CJ5, CJ6

Item	Part No.	Description	Unit	Quan.	Unit Cost	Total Cost
		Group Spring				
1	910144	Shock absorber front CJ3B	set	100	120	12,000
2	910145	" " rear "	"	100	120	12,000
3	921890	" " front CJ5-6	"	100	120	12,000
4	921897	" " rear "	"	100	120	12,000
5	931946	Bushing shock absorber	each	1,000	2	2,000
6	916646	Kit, spring shackle silent block	set	300	90	27,000
7	921055	Bearing silent block	each	500	15	7,500
8	359039	Bushing front and rear spring eye CJ3B	"	100	15	1,500
9	384228	Bolt pivot spring CJ3B	"	100	20	2,000
10	942165	Spring and bearing front CJ5, 6 (12 leaves)	set	50	900	45,000
11	925940	Spring rear assy CJ5, 6 (13 leaves)	"	50	900	45,000
12	926709	Spring front assy CJ3B (10 leaves)	"	50	900	45,000
13	916059	" rear assy CJ3B (9 leaves)	"	50	900	45,000
						268,000

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Laboratory Facilities

3 Existing laboratory facilities will be expanded and improved for use in operational field research as follows:

1. Construction of a 2 story building at each of the 3 locations (Malaria Division Headquarters, National Malaria Training Center Phrabuddhabat, Malaria Center Region II, Chiengmai).

   1.1 First floor will be an entomology lab and insectarium (12m x 15m)

   1.2 Second floor will be a parasitology lab (12m x 15m)

   1.3 Total area is $360m^2$

   1.4 Construction costs are figured at $\$125/m^2$ or $360m^2 \times \$125/m^2$ = $45,000

   1.5 Furnishing costs are estimated to be 5,000

   1.6 Total cost of each improved lab facility = $50,000

Laboratory equipment for research each of the 3 improved laboratories will be provided with adequate equipment to support operational field research. An illustrative list appears below.

	ITEM	QUANTITY PER LAB	TOTAL QUANTITY	COST PER UNIT	TOTAL COST($)
1.	Refrigerator	1	3	400	1,200
2.	Incubator	1	3	600	1,800
3.	Centrifuge Research Microscope	1	3	600	1,800
4.	With accessories	2	6	1,500	9,000
5.	Dissecting microscope	2	6	1,000	6,000
6.	EDC light trap	20	60	60	3,600
7.	Vacuum pump	2	6	100	600
8.	Miscellaneous equipment	-	-	2,000	6,000
	TOTAL COST FOR 3 LABORATORIES				$30,000

ANALYSIS OF MALARIA CONTROL PROJECT INCREASING REPORTED MALARIA CASES BY 100%
IN 000's

YEAR	TOTAL PROJECT COSTS	PRESENT WORTH	VALUE OF PRODUCTION DAYS LOST	LOST DUE TO WORK YEARS LOST	VALUE OF PATIENT TREATMENT AVOIDED	GROSS BENEFITS	PRESENT WORTH	NET BENEFITS	PRESENT WORTH
1979	9,525					-		(9,525)	
1980	10,785		1,371		100	1,471		(9,314)	
1981	10,655		2,984	1,477	218	4,679		(5,976)	
1982	8,875		4,870	3,012	357	8,239		(636)	
1983	8,875		5,299	4,991	388	10,678		1,803	
1984	8,875		6,726	7,055	492	14,273		5,398	
1985	8,875		8,364	9,192	612	18,168		9,293	
1986	8,875		10,237	11,378	749	22,364		13,489	
1987	8,875		12,376	11,578	906	24,860		15,985	
1988	8,875		13,465	11,773	986	26,224		17,349	
		53,516					57,688		4,172

Benefit cost ratio - $\frac{57,688}{53,516}$ = 1.08

Net present worth - Positive $4,172,000

IRR = 15.3%

ANALYSIS OF MALARIA CONTROL PROJECT INCREASING REPORTED MALARIA CASES BY 1/3
IN 000's

YEAR	TOTAL PROJECT COSTS	PRESENT WORTH	VALUE OF PRODUCTION DAYS LOST	LOST DUE TO WORK YEARS LOST	VALUE OF PATIENT TREATMENT AVOIDED	GROSS BENEFITS	PRESENT WORTH	NET BENEFITS	PRESENT WORTH
1979	9,525		-	-	-	-		(9,525)	
1980	10,785		914		67	981		(9,804)	
1981	10,655		1,990	1,477	146	3,613		(7,042)	
1982	8,875		3,246	3,011	238	6,495		(2,380)	
1983	8,875		3,533	4,991	259	8,483		(392)	
1984	8,875		4,484	7,055	328	11,867		2,992	
1985	8,875		5,576	9,192	408	15,176		6,301	
1986	8,875		6,825	11,378	499	18,702		9,827	
1987	8,875		8,250	11,578	604	20,432		11,557	
1988	8,875		8,976	11,793	657	21,406		12,531	
		53,516					46,986		(6,530)

Benefit cost ratio - $\frac{46,986}{53,516}$ = .88

Net present worth - minus $6,530,000

IRR = 6.3%

1/30/79

ANNEX G - Detailed Technical Analysis

1. General

The proposed anti-malaria program assistance is aimed at improvement of the general health status of the rural poor population of Thailand through the control of malaria in the mountainous and international border regions (protecting 8.7 million people), and the eradication of the disease in the remaining areas (33 million population) where a high level of control has already been achieved. The program, with modifications dictated by funding constraints, and changes in the ecological situation, follows the WHO-approved RTG Malaria and Vector Control Plan of Operations for the period 1977-1981. The project life covers the last three years of this Plan and will require USAID approval of annual plans of operation prior to the disbursement of funds.

The RTG has demonstrated its ability to implement the global malaria eradication scheme, outlined in the Sixth Report of the WHO Expert Committee on Malaria, which calls for the interruption of transmission by means of periodic applications of residual insecticide to the interiors of all homes in the malarious areas, and followed by mop-up of relapsing or imported cases through intensive case-finding and treatment. Evidence of this is in the large areas of the country now enjoying a relatively low rate of malaria, and in which the disease would have been eradicated long since, were it not for the continuous importation of parasites from the surrounding areas. The continuing transmission in the latter areas is not a result of RTG failure to follow the eradication scheme, but rather the result of the presence or development of ecological factors (vector, parasite, and human), not anticipated in the scheme.

The result is a situation in which the RTG is slowly losing its battle to protect the major advances which it has achieved, because it lacks the resources to advance in the surrounding areas where the standard eradication techniques are not, in themselves, enough to stop the transmission of malaria. Thus, despite a relatively large and increasing budget, the malaria incidence and the malaria death rates are rising each year. It is apparent that if the trend continues unchanged, it is only a matter of time

until these rates reach pre-1950 levels, and that a change in any one of a number of climatic, ecologic, or economic factors could upset the present precarious balance and produce such a reversion in very short order. What the present program requires is the ability to recognize, define, and delimit these specific problems, expertise which can range beyond the narrow limits of classical malaria eradication techniques in a search for new and innovative solutions to these problems, and the flexibility to test and apply such solutions in the field. It is largely in the development of these capabilities that this project proposes to assist the RTG.

General RTG strategy is to continue the effective active and passive case detection activities in the eradication areas, combined with limited house-spraying operations, applied only when and where epidemiological data signal transmission foci. In the control areas, major reliance will continue to be placed upon house-spraying where it is effective, supplemented or replaced by other methods of interrupting transmission, as indicated by local conditions.

The major thrust of the project assistance is directed toward these critical control areas. Its purpose is to provide the Anti-Malaria Program personnel with the knowledge and tools necessary to evaluate the areas where routine house-spraying can no longer be relied upon, ascertain the reasons for this condition, and test and apply alternate or supplementary measures developed to fit the specific situation. Although there may be some overlap of project benefits in the fields of training, research, and health education, the eradication area operations will be supported almost entirely by the RTG, as will the routine house spraying operations in the control areas.

2. Technical Review

a. Objectives:

- Develop the RTG institutional capability for maintaining advances already made in the lowland plains area by minimizing transmission of malaria in the surrounding forested foothills and mountainous area,

- Provide rapid diagnosis and treatment to those already infected,

- Maintain adequate epidemiological surveillance in all parts of the area at risk,

- Return and maintain the malaria death rate to below its historically lowest point of 10.1/100,000.

Since the traditional malaria eradication methods have been shown to be inadequate in the areas where transmission continues, an innovative approach is to be made in these areas. The social and ecological factors which have contributed to this failure vary from area to area, and a multifaceted and innovative approach must be adopted to deal with them. Attainment of the objectives is dependant upon a number of factors, which are covered in detail below.

(1) Vector Control

One major problem has been confusion among the terms malaria eradication, malaria control, and vector control. The first refers to a time-limited program whose attack phase relies upon the application of residual insecticides to the inside walls of dwellings in order to kill infected vectors before they can transmit the disease. While this technique is often erroneously referred to as vector control, it is not, because (with the exceptions of rare cases, of which An. minimus in the central plains of Thailand is apparently one) only a minute part of the total vector population is killed, and there would be as many potential vectors at the successful end of such a program as there were at the beginning, the difference being that at the end point none of the mosquitoes would be infected with malaria. A reintroduction of the parasite, as demonstrated in Sri Lanka, can rapidly mushroom the disease to pre-program levels.

It must be understood that malaria control is a long-term integrated approach to maintaining malaria at low levels. If these are low enough and maintained

long enough, it can lead, as in the U.S., to eradication of the disease. Along with epidemiology, house spraying, and chemotherapy, vector control is one of the means of achieving malaria control, and is itself an integrated program of attack upon the total population of the vector.

Mosquito control, as noted above, is largely an American commodity, which had its inception, on an operational basis, with Reed and Gorgas in the Panama Canal Zone, and John B. Smith in New Jersey at the turn of the century, and has been functioning, developing and improving ever since. In its present state, it uses a variety of chemical, biological, genetic and engineering weapons to attack all stages of the life cycle of the vector, and chooses the weapon(s) to be used in a particular situation on the basis of studies of the mosquito's habits and environment.

The RTG's Malaria Division has recently contracted with an American vector control expert under the AID sponsored Transfer of Technology and Management Skills Project (Grant 493-274), and he will be in country for one year beginning in February of 1979. The availability of this specific vector control expertise will greatly enhance the Malaria Division's capability in this important technical area.

(2) Malaria Clinics

The RTG has had excellent results from malaria clinics installed in fifty of the 242 sectors covering the control areas. The project proposes to provide microscopes and other equipment and microscopist training, to allow for the installation of a minimum of 150 additional clinics in the sectors of highest priority, and is discussing the recruitment of six Peace Corps Volunteers to monitor their operations.

The existing clinics, conveniently located in the marketing centers of the areas which they serve, provide walk-in diagnosis and immediate treatment for malaria and have been readily accepted by the public of the areas they serve.

Through the provision of convenient and timely radical treatment, the clinics should have a strong effect in reducing malaria deaths by P. falciparum

and help prevent further malaria transmission by eliminating gametocytes and rendering the host non-infectious, thereby preventing the complete development of sporogony in vectors feeding on the first day after treatment.

The greatest long term benefits of the clinics are in: reducing inadequate self-treatment, reducing the workloads and back-logs of the zonal laboratories, providing additional epidemiological information for use in pinpointing foci of transmission, sponsoring centers for the dissemination of health education relating to cooperation of the public with the other operations of the program, and providing a corps of trained and equipped personnel which can be moved into ACD mop-up acitivities when transmission has been cut, and an area is ready to graduate from control to eradication activities.

The sector clinics will not, of themselves, totally interrupt malaria transmission in an area, but serve as a valuable supplement to operations aimed directly at limiting transmission.

It is to be expected that with an increase in the number of easily accessible service points, the introduction of a large number of sick persons who already suspect that they have malaria will undoubtedly skew the epidemiological statistics and simulate rising malaria rates.

The RTG has demonstrated the feasibility of the clinic program in the areas in which it has been applied. Project support to cover initial costs of training and equipping personnel for expanding this program is certainly justified.

(3) Transport

The entomological, field supervision, and health education components of the proposed program obviously demand a high degree of mobility and adequate transport could prove a critical factor in their success or failure. At present, the program has a fleet of 598 vehicles, with an average age of 12 years, 85% of which are various jeep models manufactured by American Motors Corp. However, because of the age of the vehicles and maintenance deficiencies, breakdowns are frequent and down-time excessive, so that the actual number of vehicles available at any given moment is significantly lower

than the fleet total.

The RTG is budgetting for a minimum of 15 new vehicles each year. This project does not plan for the provision of additional vehicles, but rather for the up-grading of the existing fleet through: the overhaul of 400 vehicles, and a short-term consultant with fleet management experience to assist in organizing preventive maintenance and training programs, to assess spare part and tool requirements and to help install a parts and tools inventory control system. Five Peace Corps volunteers with mechanical experience may be requested to assist in the implementation of these plans. Tool requirements are in the area of simple hand tools as well as diagnostic equipment and safety equipment such as chain-hoists.

The existence of thousands of WW II-vintage jeeps providing bus and taxi service in many of the cities of the Orient attests to the feasibility of this approach.

At the sector level, the program also suffers from a lack of mobility of the individual workers who supervise field activities, service the village volunteers, etc. To help solve this problem, a $320,000 revolving funds is proposed to finance the individual purchase of motorcycles by the workers, to be repaid through payroll deductions with a minimal interest rate to cover administrative expenses. The AMP will also provide a travel subsidy of at least 1,000 Baht per year to 500 malaria workers who use their own motorcycles in the program.

(4) Spray Equipment

The program's 5,300 manual sprayers, though old, are in fair condition. The project covers the purchase of 2,000 additional sprayers, and a quantity of spare parts for improving and maintaining the old sprayers in good condition. With the reduced number of houses to be sprayed this should provide an ample quantity of this equipment.

Also funded through the project are 78,000 of the standard 80-02 flat-fan nozzles to allow for replacement after every two weeks of operation. This periodic discarding of eroded nozzles will result in a saving of insecticide, more precise dosage rates, and reduce or eliminate streaking of the walls.

(5) Training

The RTG training needs cover a wide range, from that of filling professional level vacancies to training the trainers of local volunteer blood-samplers and communicators. It is proposed to meet these needs through a variety of approaches.

At present, the AMP has 46 vacancies in its technical - professional staff, and with few exceptions, the leaders of the program are approaching retirement age. If the program is to adopt an innovative approach to its unique technical problems, and if it is to continue with any degree of efficiency when the present leadership is lost, it must attract qualified young professionals to its rank. One method to achieve this end is the proposed offering of Master of Public Health scholarships in U.S. universities for seven young health professionals. Response to such an offer should be large enough to allow the selection of candidates with high potential, who would return from their training with a wide knowledge of methods, an open-mindedness which will promote innovation, and an obligation to apply them in the AMP.

In-country scholarships are to be offered to B.S. graduate entomologists (whose training has been largely in agricultural entomology) to bring them to a Master of Science level in public health entomology. Their thesis research work should be directed toward actual problems facing the AMP and might well provide some of the eventual solutions. These persons would also incur an obligation to serve in the AMP.

Twelve technical personnel of the program are to receive short-term training in the U.S. which would include the CDC short course in vector control and the opportunity to observe selected U.S. mosquito abatement agency operations.

Thirty-five technical personnel are to receive short-term training in 3rd country malaria control facilities.

The capacity of the existing AMP national training center is to be doubled and necessary training equipment provided for it and five regional training centers. With this increased capability, in addition to

new training covered in other sections of this report, 500 regional and zonal AMP staff members and key national health personnel will receive refresher training, and AMP staff will be trained and equipped to provided sector level training for 2,500 community volunteers in 20 provinces of the control area. A consultant is to be provided to assist in organization and planning of curricula.

(6) Insecticides

House-spraying with DDT has been successfully applied over a large portion of Thailand. Where it works, it is the most cost-effective method of malaria control or eradication available. The problem areas in Thailand are those in which, for a variety of reasons, this method does not work, or works only at a decreased level of efficiency.

The problem is apparently not in the insecticide itself. Susceptibility tests of the vectors reveal no significant development of resistance to DDT, after 25 years of malaria program use of this insecticide in Thailand. It is likely that if the local vectors had the genetic make-up to develop a resistant strain it would have made itself evident long ago. Global experience indicates that such development seldom if ever occurs under the pressure of malaria program house-spraying alone, since normally only a tiny fraction of the total vector population is treated. Usually DDT resistance is associated with heavy agricultural usage of the insecticide in the same areas. This has not occurred in Thailand and a law now on the books should prevent it in the future.

The water-wettable DDT which the RTG now purchases for this operation, and plans to continue to purchase, is of U.S. origin and meets both AID and WHO quality standards.

As a possible solution to the householders' refusal to permit spray operations, DDT emulsifiable concentrate is being used in some instances instead of water-wettable powder. This material is formulated in Bangkok from imported ingredients, and its quality is not consistent. The RTG is taking steps to correct this fault.

Malathion is being used on a relatively small scale in ULV or thermal fog applications, and Abate

in limited quantities as a larvicide. The RTG will continue to fund the purchase of these chemicals for routine application, while the project will provide for small quantities of other insecticides for test purposes.

(7) Anti-Malarial Drugs

While some degree of resistance of Plasmodium falciparum to chloroquine has been detected in parts of Thailand, these parasites are still susceptible to Fansidar (a sufadoxine/pyrimetamine compound). The AMP maintains a program of chloroquine testing to define those areas in which it is no longer effective, and routinely tests for Fansidar resistance so that if it occurs it will be detected early.

The RTG will continue to fund the purchase of these drugs which are routinely used. Small quantities of other drugs with proven anti-plasmodium action for testing against the Thai strains will be provided by the project under the Operational Research Component.

(8) Householders' Refusal

In many of the areas in which DDT house-spraying is being applied, the rates of refusal of entry by householders has risen to over 50%. The resulting failure to approach full coverage may be a major reason for the continuing transmission in some of these areas.

Among the many reasons given for refusals is that the spray discolors the walls. An attempt has been made to answer it by using an emulsion rather than the normal suspension, to give a more even coverage. More attention to the condition of spray nozzle tips may also work to this same end.

However, it is probable that the real reason behind the excuses is simple weariness with having the household disrupted by spray operations twice a year for so many years while malaria transmission continues apparently unabated. Unfortunately the spray squad leader suffers the same weariness, and with a given area to cover in a given time, may be too prone to accept any excuse and move on to the next house without arguing the point.

The primary answer to both problems lies in education, of the householder to the fact that even if not 100% effective, the spraying affords some degree of protection, and the possible avoidance of even one case of malaria in his family is worth the inconvenience of the spraying; and of the sprayman and his squad leader to the fact that in order for the program to be effective all, or at least a very high percentage, of the houses must be covered and that part of his job is selling the service.

(9) Health Education

As mentioned elsewhere, the education and motivation of the public in personal protection from malaria and the need for cooperation with the AMP is of vital importance to the success of this project. The program's Health Education Section will be strengthened and equipped through project funding, thus enabling that section along with the Training Section to make every AMP and general health services employee an active promoter of malaria control.

One innovative approach to be sponsored by the project is the contractual use of a Thai advertising agency of proven ability in selling tangibles to the Thai public to design a program, produce audio-visual material, and assist in the writing of literature, for the purpose of selling the concept of malaria control and the need for cooperation to the population of the malarious areas of Thailand.

(10) Research

If the AMP is to take the proposed innovative course of improvising new methods or adapting old methods of interrupting transmission, a system of testing is a requirement. No matter how effective a new or modified method may appear in theory; it must be scientifically tested on a pilot basis in the field before time and resources are committed to it on a large scale. The project includes a fund to support such studies by expanding and equipping existing AMP research facilities, and providing test quantities of materials. WHO and AFRIM (Armed Forces Institute of Medical Science) have agreed to assist in setting up test protocols and with monitoring research projects.

Pure basic research into new insecticides and drugs should be avoided, since the manufacturers and the universities are better funded and equipped for producing new compounds and such materials must undergo exhaustive long-term testing by WHO before they can be applied operationally in the field. Program and project research emphasis in this field is on the performance under the local conditions, of materials already cleared by WHO, in order to provide an arsenal of alternatives in case of the failure of DDT or the drugs now in use.

Program entomologists need to learn more about the vectors in the problem areas. Studies of the biting habits and preferred breeding and resting sites of An. balabacensis and minimus are imperative if their populations are to be reduced, and the vector potential of other Anopheline species needs scientific assessment. With this knowledge in hand, testing of methods of reducing or manipulating the sources and/or killing larval and adult mosquitoes can proceed toward the objective of reducing the total population of vectors, thus also reducing the probability of transmission.

(11) Insurgency Areas

These border areas present a special problem. Malaria personnel cannot be expected to work in areas where they are considered as primary targets by armed insurgents, nor can the inhabitants of such areas be expected to accept AMP services when such acceptance makes them subject to reprisal.

Since three neighboring countries (Laos, Burma, and Cambodia) are not providing effective malaria control, Thailand must plan on maintaining a barrier area of control at the borders throughout the foreseeable future, in order to protect itself from imported parasites. From a malaria control viewpoint, the only way to approach the insurgency area problem is to consider its inner boundaries as if they were the country's borders, with no attempt made to cross them, but with a tight barrier inside them. As insurgency is controlled, the AMP can extend its own borders to include the re-secured areas.

(12) Integration

On the basis of its own early attempts, the RTG is not contemplating the absorption of the AMP into the general health services in the near future, and on the

basis of global experience, (Sri Lanka being a glaring example) AID should not urge such a step.

At this stage of development of the program, the RTG policy of encouraging the general health services cooperation in the malaria control effort is sounder and more logical, and this project's training and health education components support this policy.

(13) Dengue-Hemorraghic Fever

The MOPH 1977-1981 Malaria and Vector Control Plan of Operations contains a large DHF increment, and calls for the assumption of responsibility for DHF control by the Malaria Division. Because of funding constraints and the increasing malaria problem this has not been implemented beyond the removal of DHF responsibility from the MOPH Division of Medical Sciences and placing it in a new DHF Division alongside the AMP in the MOPH's Communicable Disease Control Department. In practice, there is no ongoing preventive program of the control of DHF vector. The DHF Division is concerning itself largely with epidemiology, and calling upon the AMP for emergency vector control assistance when a DHF outbreak occurs. This, of course, places an extra strain on the AMP's already limited resources.

Inasmuch as the RTG has not integrated the two programs, and since DHF is essentially an urban disease, this project in its reduced form does not address the DHF problem as such. However, the removal of some of AMP's constraints by project action will undoubtedly increase its capability for handling DHF epidemics, and the overlaps in health education, training, and vector control research will inevitably provide direct benefit to the DHF control effort.

(14) Technical Assistance

Short-term consultant assistance is programmed as a part of several of the preceeding sections, as noted, and may also be required from time to time to provide specific expertise in the solution of particular problems or the application of specific measures.

In addition, the project is sponsoring two field monitors (U.S. citizens) on contract to USAID who are fluent in the language and have experience working in the RTG Malaria Division. They will be able to follow the implementation of project activities and will concentrate in the areas of training and sector level control activities.

The Malaria Division is also fortunate to have the Armed Forces Research Institute of Medical Sciences located in Bangkok and the two organizations have had strong informal relationships for many years. The project will seek to formalize the contact between the two agencies so that both organizations can share their expertise on a more regularized basis.

The project might also benefit from a direct hire malaria advisor however due to personnel restrictions it is questionable whether or not a full time advisor could be accommodated in the mission personnel ceiling. USAID/Thailand would be very interested in a regional advisor that could devote half time to the Thailand project; and it is thought that such an individual would work well with the excellent host-national staff within the Malaria Division.

F. Conclusion

Based on this analysis, it is concluded that the proposed program and project are technically sound, and that the planned objectives can be attained through their implementation.

The major need of the program is for new methods to supplement the eradication techniques in those areas of the country where they have proven inadequate, and the thrust of the project is to build the Malaria Division's capability for developing such methods. At the present time, no magic bullet (as DDT was once considered to be) exists which will solve all of Thailand's problems with malaria and with the variety and complexity of these problems, no single procedure is likely to be found which will solve them all. An approach will have to be devised and tailored to fit each situation, and then tested for effectiveness. Under these circumstances such tests will probably end in

failure to control transmission more often than in success. However, it must be borne in mind in such cases that failure to control transmission is not a failure of the test, since the test itself has been successful in that it has eliminated one theoretical method. Under a given set of conditions, only one of a series of trial methods needs to succeed in interrupting malaria transmission to provide the solution to the particular problem of that area, and with appropriate modifications may be the answer to other areas with similar problems not only in Thailand but throughout the world.

Summary of Spraying Operations for the Whole Country of Thailand
Year 1975-1977

	1975		1976		1977	
	Cycle 1	Cycle 2	Cycle 1	Cycle 2	Cycle 1	Cycle 2
No. provinces sprayed	59	59	59	56	59	56
No. districts sprayed	340	292	366	305	389	392
No. villages sprayed	9,587	4,462	9,038	4,319	8,871	4,507
Total houses sprayed	1,014,817	440,862	1084,517	374,800	1030,835	434,106
Total incompletely sprayed houses	496,320	213,834	575,119	184,284	563,044	216,444
Percentage of incompletely sprayed houses	43.03	42.89	46.57	44.17	48.45	45.75
Total unsprayed houses	138,389	58,221	150,464	42,373	131,321	49,563
Percentage of unsprayed houses	12.00	11.67	12.18	10.16	11.30	10.25
Total huts sprayed	232,158	114,901	258,893	203,207	231,168	151,509
Population in sprayed houses	5,221,146	2,200,519	5[illegible]4,958	1892,860	5293,578	2149,967
DDT 75% used (kgm.)	736,729.5	391,400	760,882.5	294,143.5	679,223	296,886
Average DDT used per capita (gm)	141.10	145.14	135.99	155.40	128.31	138.08

Results of Blood Film Examination

	1973	1974	1975	1976	1977
Total Films Examined	4,000,950	4,058,159	4,115,965	3,702,846	4,044,227
Total Positive	201,103	286,753	312,116	299,230	317,161
P.falciparum	156,904(78.20%)	211,653(73.8%)	200,342(64.19%)	165,326(55.25%)	164,055(51.73%)
O.vivax	42,639(21.20%)	73,311(25.57%)	110,084(35.27%)	132,318(44.22%)	151,809(47.86%)
P.malariae	160(0.08%)	96(0.03%)	87(0.03%)	111(0.04%)	106(0.03%)
Mixed	1,400(0.70%)	1,693(0.59%)	1,693(0.59%)	1,475(0.49%)	1,191(0.38%)

The above statistics were derived from the laboratory services section

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Results of Surveillance Activities (1973-1977)

	1973	1974	1975	1976	1977
Population covered by surveillance	32,827,148	34,465,724	36,013,664	39,743,090	40,947,698
Blood smears examined **	3,397,909	3,608,342	3,589,238	3,600,475	3,973,513
Positives	144,855	238,950	267,534	287,547	315,431
SPR%	4.2	6.6	7.4	7.9	7.9
ABER%	8.8	8.9	8.7	7.4	7.9
API%	4.4	6.6	7.4	7.2	7.7

** Blood smears taken ACD, PCD, Mass blood survey.

(National Malaria Eradication Project)

10 APRIL 1978

Type of Vehicle	Central office Bangkok	Region 1 Prabudhabat	Region 2 Chiengmai	Region 3 Khonkaen	Region 4 Songkhla	Region 5 Bangkok	TOTAL
Jeep C.J. 3 B	-	38	35	29	33	29	164
Jeep C.J. 5	1	6	5	8	9	7	36
Jeep C.J. 6	1	30	48	22	27	30	158
Station Sedan	-	1	1	1	1	1	5
Station Wagon	4	1	2	1	2	-	10
International, Travel-all	-	1	-	-	-	-	1
International, Truck	-	1	2	1	2	2	8
International Scout	3	2	2	-	2	5	14
Dodge Power Wagon	-	1	1	-	-	2	4
Dodge Truck	-	1	6	-	3	3	13
Pick-up	-	10	3	17	6	10	45
Pick-up Gladiator	1	11	15	15	14	11	73
Wageneer	2	3	3	3	2	2	15
Chevrolet Truck	-	6	-	1	6	4	17
Reble	2	1	-	1	1	-	6
Jeep, Russian	=	-	2	-	-	-	2
Land Rover	2	3	3	2	3	2	15
Mitsubishi Jeep	1	-	2	-	3	2	8
Toyota Hilux	-	5	-	2	-	-	5
TOTAL	18	125	130	103	113	110	598

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AGE OF VEHICLES USED IN NATIONAL MALARIA ERADICATION PROJECT

10 APRIL 1978

Type of Vehicles	Over 25 years	1953 25 yrs	1954 24 yrs	1955 23 yrs	1956 22 yrs	1957 21 yrs	1958 20 yrs	1959 19 yrs	1960 18 yrs	1961 17 yrs	1962 16 yrs	1963 15 yrs	1964 14 yrs	1965 13 yrs	1966 12 yrs	1967 11 yrs	1968 10 yrs	1969 9 yrs	1970 8 yrs	1971 7 yrs	1972 6 yrs	1973 5 yrs	1974 4 yrs	1975 3 yrs	1976 2 yrs	1977 1 yrs	Total No.	No. in used
Jeep C.J. 3 B		1		1	5	8																						
Jeep C.J. 5															151												164	164
Jeep C.J. 6														2				30	3	1							36	36
Station Sedan										22	44			4			25	5	45								158	158
Station Wagon														5													5	5
International, Travel-all										7	3																10	10
International, Truck											1																1	1
International, Scout											19																8	8
Dodge Power Wagon											14																14	14
Dodge Truck	1		4								3								1								4	4
Pick-up													1										7				13	13
Pick-up Gladiator												45															45	45
Wagoneer															36		17	20									73	73
Chevrolet Truck															15												15	15
Reble														16						1							17	17
Jeep, Russian																			5								5	5
Land Rover										2										2							2	2
Mitsubishi Jeep																			1	2			2	10			15	15
Toycta Hilux																									8		8	8
TOTAL	1		4		5	8			13	29	75	45	1	27	202		42	55	54	2	5			9	10	13	598	598

MOTORCYCLES DISTRBUTION BY REGION

NMEP, THAILAND

10 APRIL 1978

Type of Motorcycles & Size	Central office Bangkok	Region 1 Prabudhabat	Region 2 Chiengmai	Region 3 Khonkaen	Region 4 Songkhla	Region 5 Bangkok	TOTAL
YAMAHA 50 cc.	-	14	8	18	10	17	67
YAMAHA 80 cc.	-	1	-	5	1	-	7
HONDA 50 cc.	-	-	-	-	1	-	1
HONDA 90 cc.	-	-	-	-	-	1	1
SUZUKI 80 cc.	-	-	-	-	-	1	1
SUZUKI 120 cc.	-	35	33	28	34	19	149
SUZUKI 125 cc.	-	8	8	8	8	11	43
YAMAHA 125 cc.	-	10	10	12	10	10	52
SUZUKI 100 cc.	-	10	10	10	10	10	50
TOTAL	-	78	69	81	74	69	371

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AGE OF VEHICLES USED IN NMEP, THAILAND

MOTORCYCLES

10 APRIL 1978

Type of Motorcycles and Size	Over 12 Years	1966 / 12 yrs	1967 / 11 yrs	1968 / 10 yrs	1969 / 9 yrs	1970 / 8 yrs	1971 / 7 yrs	1972 / 6 yrs	1973 / 5 yrs	1974 / 4 yrs	1975 / 3 yrs	1976 / 2 yrs	1977 / 1 yrs	Total No.	No. in used
YAMAHA 50 cc.		67												67	67
YAMAHA 80 cc.		7												7	7
HONDA 50 cc.					1									1	1
HONDA 90 cc.						1								1	1
SUZUKI 80 cc.		1												1	1
SUZUKI 120 cc.						149								149	149
SUZUKI 125 cc.											43			43	43
YAMAHA 125 cc.												52		52	52
SUZUKI 100 cc.													50	50	50
TOTAL		75			1	150					43	52	50	371	371

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Applied Research - Malaria - Thailand

Priority No.	Subject	Duration of Funding	Commencement Date of Funding	Principal Investigator	Scientific Assistants	Sections and Regions of the Malaria Organization involved in study: Epid. HQ	Ent. HQ	Sp. Opera. HQ	Lab. HQ	Hlth. Ed. HQ	Reg.I	Reg.II	Reg.III	Reg.IV	Reg.V	Institutional Cooperation
1	In-vitro studies to determine the distribution and extent to Chloroquine resistant strains of P.falciparum in Thailand	3 yrs	1978	Dr. Viri Pleisai	Mrs.Laksami Yisunseri Miss Pairoh Yamokgul Miss Suvanna Limcook	✓			✓			✓ Epid. Lab.		✓ Epid. Lab.	✓ Epid. Lab.	
2	Use of larviverous fish in the control of A.minimus in the slow running stream in Thailand	6 yrs	1978	Dr. Suria Pinichpongse	Mrs. Amporn Imvitthya Mr.Veerapol Potijitti						✓ Ent.			✓ Ent.		
3	Response of A.minimus to DDT house spraying in an area under control measures in Phrae Province, Northern Thailand	5 yrs	1978	Dr. Udom Chitprarop	Mr. Phorn Sawasdiwongporn Mr. Sawai Matsarat							✓ Ent. Epid.				
4	Trials with slow + control larvicide formulation against larvae in gem mining pits in S.E. Thailand.	4 yrs	1978	Mr. Suthas Ratanathepasa	Mr. Sakorn Limrat Mr. Suchart Phatiphongse	✓	✓								✓ Ent. Epid.	
5	To determine effectiveness of the presumptive Rx regimen at present in use.	2 yrs	May 1979	Dr.Somchai Mantavithya	Miss Rachanee Lotong Miss Aporn Lowanpol Mrs. Amporn Imvitthya	✓									✓ Epid.	
6	Studies of the migration of people into socio-development areas e.g. sugar cane, tapioca, gem mining, land resettlement, dam construction etc. Lotong and the effect on the transmission of malaria.	3 yrs.	1979	Dr. Somthas Malikul	Miss Supranee Mollchat Miss Boonsa Tantagsyoon Miss Rachanee Lotong	✓				✓			✓ Epid H.Ed		✓ Epid. H.Ed.	
7.	Strain typing of Chloroquine resistant Pf.determine by in-vitro test.	3 yrs.	1979	Dr. Sodsri Thaithong	Dr. Thada Mrs.Laksami Yisunseri	✓			✓			✓ Epid. Lab.		✓ Epid. Lab.	✓ Epid. Lab.	Department of Biology Chulalongkorn Univ.
8	To develop control approaches in the forest fringe + forest hilly areas where A.b.balabacensis transmits malaria	5 yrs.	Jan.1980	Dr. Chusak Prasitti-suk	Mr. Veerapol Potijitti	✓	✓	✓			✓ Ent. Epid. Opera.					
9	To determine an effective drug regimen for MDA as an additional remedial measure for malaria, outbreak, and for using as an additional control measures to reduce parasite reservoir prior to the main transmission season; abd to compare chemoprophylaxis for selected groups using 300 mgms. Chloroquine weekly, Fansidar 1,000 mgms. every 2 week, Camoquine 300 mgms. weekly	3 yrs.	Jan. 1980	Dr. Chaiya Poolthong	Miss Supranee Mollchat										✓ Epid.	Trop. Med.
10	A study to determine ways and means to improve residual insecticide coverage for malaria control	2 yrs	1980	Mr.Aueychai Pachpibul	Mr. Trairat Sanchong-Aksorn Mr.Chiera Bonyang			✓		✓		✓ O.P. H.Ed		✓ O.P. H.Ed.		
11	To develop an effective and economical system of case detection & treatment in order to reduce malaria morbidity & mortality	3yrs.	Jan. 1980	Dr.Preeda Kacharat	Mr. Sant Tinop Miss Boonsa Tantagsyoon	✓						✓ Epid. Ent.				Rural Hlth. Min.P.H.

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Applied Research - Malaria - Thailand

Priority No.	Subject	Duration of Funding	Commencement Date of Funding	Principal Investigator	Scientific Assistants	Sections and Regions of the Malaria Organization involved in study: Epid. HQ	Ent. HQ	Sp. Opers. HQ	Lab. HQ	Hlth. Ed. HQ	Reg.I	Reg.II	Reg.III	Reg.IV	Reg.V	Institutional Cooperation
12	To develop simple effective methods for the clinical management of severe malaria cases with the prime objective of reducing mortality due to the disease especially among the non immune and vulnerable sector of the population.	3 yrs.	Jan. 1986	Prof. Khunying Tranakchit Harinasuta	Dr. Somchai Mantavithya Prof. Assistant											Trop. Med. Mahidol Univ.
13	To determine a more effective Radical Rx of Pf. using quinine plus Fansidar.	2 yrs.	1981	Dr. Suria Pinichpongse	Miss Arpara Leemapol						✓ Epid.					
14	To study ways and means of improving the efficiency and effectiveness of malaria diagnosis and the malaria laboratory services with objective of reducing delay in Radical Rx.	2 yrs.	Jan. 1981	Dr. Somthas Malikul	Dr. Somchai Mantavithya Mrs. Laksami Yisunsri Miss Fairah Yamokgul	✓			✓							
15	To determine drugs comonly available in the market for self treatment of malaria	3 yrs.	June 1981	Mrs. Marissa Nipakasem	Miss Racharee Lotes	✓				✓					✓	
16	A study of the ways and means of motivating the community to prevent the spread of malaria and to participate and cooperate in anti-malaria activities and the effectiveness of the VHV and the MVC in the prevention and control of malaria at the village level	2 yrs.	1982	Dr. Udom Chitprarop	Reg.II H.Ed.					✓		✓ H.Ed.				Rural Health Div. PCHD.
17	In control areas a study of vector bionomics and their response to DDT in index areas located in the North, Central, South and coastal of A.minimus, A.b.balabacensis, A.maculatus, A.sundaicus and vectors	3 yrs.	1982	Dr. Suria Pinichpongse	Dr. Chusak Prasittisuk Mrs. Laksami Yisunsri Miss Thitiya Chidtihuntia	✓	✓			✓ Epid. Ent.		✓	✓	✓	✓	
18.	Factor responsible for persistence of malaria transmission in: a) Rubber plantations b) Sugar cane cultivation areas c) Gem mining areas	3 yrs.	1982	Dr. Somthas Malikul	Mrs. Laksami Yisunsri Dr. Chusak Prasittisuk Miss Boonma Tantaqayoos Miss Suprance Molichat	✓	✓						✓	✓		
19	A longitudinal study of the cost effectiveness and benefits derived from anti-malaria methods used.	5 yrs.	1982	Dr. Somthas Malikul	Mrs. Marissa Nipakasem	✓			✓					✓ H.E.	Epid. Section SEARO	WHO Financing

Applied Research - Malaria - Thailand

Priority No.	Subject	Duration of Funding	Commencement Date of Funding	Principal Investigator	Scientific Assistants	Sections and Regions of the Malaria Organization involved in study: Epid. HQ	Ent. HQ	Sp. Opers. HQ	Lab. HQ	Hlth. Ed. HQ	Reg.I	Reg.II	Reg.III	Reg.IV	Reg.V	Institutional Cooperation
20	Study of the malaria immunity status of selected groups within the population e.g. hilltribes and minority groups	3 yrs.	1983	Mrs. Laksana Visuwarit		✓					✓ Ld.	✓ Epid.				
21	Activation of gametogenesis in Pf. and Pv. with Panalidar.	This study is presently being conducted by the Armed Forces Research Institute for Medical Science.														
22	Determination of minimal effective dose of primaquine in respect of its gametocidal and sporontocidal	This study is presently being conducted by the Armed Forces Research Institute for Medical Science, who are investigating the 5 day treatment regimen.														AFRIMS
23	To determine the minimal effective dosage for radical Rx of vivax	This study is presently being carried out by the Faculty of Tropical Medicine Mahidol University														Trop. Med.
24	To determine the effectiveness of Sulfadoxine/Pyrimethamine as presumptive Rx of Pv.	This is presently being studied by the Faculty of Tropical Medicine Mahidol University and AFRIMS.														AFRIMS Trop. Med.
25	In-vivo and in-vitro studies of the response of Pf. to sulfadoxine/ pyrimethamine and to sulfalene/ pyrimethamine.	The in-vivo response of Pf. treated with sulfadoxine/pyrimethamine has been monitored for the past 4 years in Phrabuddhabat and for 6 years in other areas of Thailand by the Armed Forces Research Institute for Medical Science. There has been no change in the past 2-3 years, this combination is still 80-90% effective. The in-vitro technique for this drug combination has not been perfected. Studies on Sulfalene/pyrimethamine will be done by AFRIMS.														AFRIMS Trop. Med.
26	Comparison of invitro and in-vivo response of Pf. resistant to 4-aminoquinolines			Prof. Khunying Tranakchit Harinasuta												Trop.Med. Mahidol Univ.
27	In eradication areas where spraying has been withdrawn a study of the bionomics of secondary and/or suspected sectors															Trop.Med. Mahidol Univ.
28	Species complexes of A.minimus & A.b.balabacensis and their role in Epidemiology and control of malaria	5 yrs.	1983	Dr.Surin Pinichpongse	Dr. Chusak Prasittisuk Mrs. Ampora Imvitthya	✓				✓ Ent.						AFRIMS* and Mahidol Univ.

* AFRIMS has been assisting Dr. Rai Mai in Mahidol to do some work on Cytotaxonomic studies using gel electrophoresis. However this is highly complex and difficult subject and although AFRIMS is interested in A.minimus and A.b.balabacensis they can make no commitment for this study.

Annex H - Detailed Social Analysis

I. Introduction

The reduction of morbidity and mortality due to malaria can be accomplished through two approaches, usually used in concert, attacking the parasite and/or attacking the vector. On the surface the technology employed in both of these approaches seems quite easy to understand hence the perplexing recurrence of malaria throughout Southeast Asia; however, the social issues concerned with malaria control are so significant, that they may be the single most important criterion in predicting project success. Because of the importance of the social analysis in malaria control, this report will attempt to present a brief general social overview for Thailand and the Thai health sector, outline the static assessment of the major social factors affecting malaria control, and then outline how this project's plan of action will decrease malaria morbidity and mortality.

II. Social Overview of Thailand

Thailand, a country of 45 million population in 1978 has 200,000 square miles and is located 15 degrees above equator. The country has a large central lowland area (of 62,000 square miles) that produces most of the country's agricultural products with 30% of the land. The climate is tropical with temperatures ranging from 80-100 degrees F. in the spring months to 60-90 degrees F. in the winter months depending on location. The bulk of the population works in agriculture, and with the exception of Bangkok (population 4.5 million) all other urban areas are less than 105,000 population yielding an urban population of 15% versus a rural population of 85% in the country.

Although there are regional dialects in the country, 97% of the population speak Thai with the remaining 3% speaking some Malay in the South or hilltribe languages in the mountains of the Northwest.

The literacy rate is estimated to be 82% based on the number of graduates finishing the fourth grade; however, secondary school education (past the primary grades) is a luxury not affordable to all as the secondary schools charge tuition.

One of the major factors binding the population of Thailand together is religion. Buddhism is the single most important determinate in the customs and mores of the country, and 95% of the people practice Theravada Buddhism. In addition, Buddhist monks participate very actively at all levels of community organization and are an extremely pervasive and important social force in Thai life. Of equal or greater importance are a common set of cultural and social-relational conditions comprising such aspects as respect for the monarchy, nationalism, common standards for behavior toward others, respect of elders and those of higher social status, etc.

III. Health Overview of Thailand

Thailand's health system suffers from a paradox common to health systems of other Asian developing nations: there are a myriad of problems in health to be addressed and yet the existing government supported system is under-utilized. It is estimated that only 15% of the persons requiring or seeking medical care in Thailand go to government sponsored facilities. An additional 20% seek service from health professionals in the private sector (often daytime employees in the public health sector); however, 50% receive services from pharmacies and druggists and 15% seek out traditional healers, spiritual advisors and/or injectionists. In other words, by a very conservative estimate, well over half of the people living in Thailand seeking medical services receive care from untrained (in a western sense) non-health professionals. The social implications of this data, aside from the traditional explanations of non-accessability, are quite interesting: people seek out the kind of care they perceive as necessary in the surroundings that are comfortable and delivered with an acceptable consideration for their feelings.

There are several examples that can be used to better illustrate the Thai public health system, its utilization, and the health understanding of the people in the country.

A. Service Utilization. When urban and rural residents seek out government sponsored health services they generally bypass the tambon (township) or amphur (district) health clinic system and go directly to the provincial or municipal hospital. Even poor residents of rural Thailand are aware of western styled curative interventions, and when they are required (according to determinations that are made by the service recipient) they seek out the best available.

B. Health Awareness. When there are major public health warnings such as typhoid and/or cholera epidemics, the majority of rural and urban people take precautions with their water supplies, i.e. they boil their water. When the warning is lifted they then stop. In other words, water boiling and other precautionary health measures are well known throughout Thailand (and used quite extensively when affordable) but people seem to make a very practical cost/benefit or labor/benefit analysis concerning preventative health: if its worth it not to suffer the consequences then positive action is taken.

C. Health Costs. Free health services in the rural areas are not free. Most rural health service centers charge a fee for diagnosis or treatment unless the individual establishes the fact that they cannot pay for service or pharmaceuticals. In addition, often times rural health practitioners who are daytime employees in the public sector (midwives and sanitarians) are evening employees in the private sector. Off-duty medical practices also provide the bulk of the income for rural health practitioners as the governmental salaries are low (average $75.00 per month).

IV. Social and Cultural Habits Affecting Malaria Control

A. In the Society

There are several factors common to Thailand that make malaria control extremely difficult. Many of these characteristics concern living style and income generation which supersede preventive health interventions in importance to the Thai. Employment and cultural patterns conducive to the spread of malaria include:

1. Mining - Thailand has two major mineral industries that are closely tied to the transmission of malaria. They are tin and gem mining. Tin mining is often active in remote forested areas where labor is brought in and housed in makeshift quarters. Workers generally work a five or six day shift out at the mine site, and then travel to villages to be with their families. As many are unprotected in the field, they contract malaria and then spread the disease when they return to their families in village areas.

The gem mining is even more difficult as the miners are often private entrepreneurs working under no supervision. Much of the mining is done in pits, which are

left open after the termination of the gem search. These pits then fill up with water, and are excellent breeding places for malaria vectors. In addition, some of the gem mining activities employ hydraulic sprays to wash away the dirt and reveal the gems in the earth thus providing much of the water necessary to fill breeding places. Gem miners, like other persons in the mining professions, do not live permanently in the mine area, but travel to a permanent home in a village or farm upon completion of several weeks of work. Thus they contract the disease in the field and then bring it home during their visits.

2. Timber Products - Thailand has rich timber resources located in the highly malarious hill areas. These forests are cut both illegally and legally by men who live at the cutting site for several weeks at a time in temporary housing. During their stay in the mountain areas they contract malaria and then when they travel to the lowlands to rejoin their families they transmit the disease. Control measures are made even more difficult for the illegal foresters as they do not want to be found while in the forest nor do they want to be identified as foresters while in the village making it difficult for an official government agency to dispense prophylactic treatment.

3. Rubber Production - Rubber plantations located in the malarious areas of southern Thailand pose another problem for malaria control. Rubber forests have a high canopy that nearly blocks out all sunlight thus keeping the forest floor very cool and moist - ideal for mosquito breeding. In addition, rubber tapping or harvesting must be done at night or early morning as the sap will not run during the daylight hours. Rubber tappers rise generally about 2 a.m. and go to the forest to begin work and then finish about 8 a.m. During the time they are in the forest they are exposed to the malaria vector and then when they return to their homes they transmit the disease if infected.

4. Farming Practices - Although the bulk of Thailand's agricultural production is in established agricultural areas, many farmers are faced with constraints when their families grow. In order to supplement their income, they often operate two farms. One is the traditional farm in the established agricultural area and the other is in the mountain farming areas. The farmer often will go to the hill area for several weeks at a time in order to clear the land, plant the rice, and allow it to establish itself. During their period in the hill area the farm workers will live in teamporary housing thus exposing themselves to the mosquito

vector. After the rice or other crop has gotten a foothold they will return to the main farm area and if they are infected with malaria they will then transmit the disease.

5. Inter-country Migration - Malaria transmission in Thailand is mainly concentrated in the border areas of the country and three of the four countries making a border with Thailand have no active malaria control effort. In addition, many of the people who live in border areas have relatives and friends in both countries so that there is heavy traffic between all of the neighboring countries. Since there is no active malaria program in Burma, People's Republic of Cambodia or Laos, and travelers often are in unprotected dwellings at night, transmission of malaria is rampart. In addition, anti-malaria drugs are often unavailable, or if available extremely expensive, in the neighboring countries so that the parasite reservoir growth is unchecked.

6. Inaccessibility of Health Facilities - Although Thailand's health system is relatively accessible by road it is not as accessible to poor rural residents of mountainous areas who have high temperatures and are in a weakened physical state due to malaria. Many of the high transmission areas are 8 to 12 hours from an unpaved road and then several hours further from a health clinic. Therefore, when one gets sick in a very rural area they often do not come for treatment immediately hoping that the disease will pass in order to avoid a long trip out of the forest. In addition, non-accessibility causes one who has had the disease recently, not to take a full dosage of pharmaceuticals so that some can be saved in case they have the disease again.

7. Insurgency - Insurgency, by definition, causes an unstable state during which it is difficult to operate necessary governmental services. The more important the services the more disruption that will be caused through their cessation; therefore, malaria control activities are ideal targets for insurgent action. In Thailand, malaria workers are often not the direct target of insurgent actions and in several confrontations have been released unharmed; but, often times insurgent action is non-personal in nature and since malaria is a governmental service it is open for attack. In recent years the Malaria Division has attempted to label their offices and vehicles clearly with large signs saying "MALARIA" in Thai; and, they have gotten away from wearing the governmental uniform in high- insurgency areas. However, the fear is always there and malaria services are affected as a result.

8. Religious Migrations - In some malarious regions Buddhist monks have traveled to distant places and their travel has resulted in a group of followers making long migrations. Although this is not a major problem in malaria transmission, those people in attendance are not protected from malaria transmission as they often sleep out-of-doors in the evening. Although this sounds like a minor cause of transmission, the Malaria Division has traced several large scale outbreaks in non-malarious areas to visits by religious groups that are indigenous to the mountain areas.

9. Personal Protection - Personal protection costs money and is a nuisance for people to do on a regular basis. Thai village residents usually go out-of-doors in the evening to talk and entertain one another. Unfortunately, the evening is also the time when most of the malaria vectors do their feeding, thus the social habits of the village residents promote the transmission of the disease. In addition, many times the resting places for the mosquitoes out-of-doors will not have been sprayed with DDT (trees, bushes, etc.) so that the transmission cycle is not interrupted.

In regard to mosquito coils, nets and repellant all are expensive and are not popular/nor do they conform with the cultural habits of the people. (A net is very effective; however, one has to be in-doors and enclosed in it to benefit from its effect).

10. False Beliefs Concerning Malaria Transmission - Among the older generation in Thailand there is a belief that malaria is transmitted through dirty water and not by mosquitos. This presents a problem during spraying and in recommending preventive measures as often times the village elders may contradict the advisor or malaria worker. In addition, a public correction will make an elder or respected person in the community look foolish and in the long run may do more to cause non-cooperation that any other single factor. Therefore, one must use extreme care in refuting traditional beliefs, and caution must be used in identifying the person to make the intervention.

11. Appeal of Pharmaceutical Treatment - One of the prime reasons people select self-treatment or pharmaceutical treatment over government health services is the time factor.

Since the pharmacist wants to keep the individual as a steady customer, service is quick - although not always correct - and an attempt is made to establish rapport with the individual seeking treatment. The medical offices in Thailand - both private and public - often are set up on a traditional appointment system thus necessitating long waits for those persons coming in off the street for treatment. When one is in a hurry or in pain, speed of treatment is one of the important considerations; therefore, pharmacies are often chosen as the treatment facilities. It is likely that a variety of other factors are also involved in villagers' reluctance to visit formal health facilities. Anonymity and the lack of a one-to-one relationship are probably most important, also fear of uncertainty in what will happen to them.

12. Asymptomatic or Non-debilitating Malaria - Since many persons living in highly malarious areas have been exposed to the disease for a long time, there has been a high degree of tolerance developed to the disease. Some persons are carriers and are asymptomatic; others may have a flare up of fever that lasts for several hours and then they feel fine for a day before the next fever manifestation. The part time symptoms then last for several weeks and disappear for a year or two; and, they are not considered serious enough to necessitate treatment.

13. Tolerance to Pain and Inconvenience - The rural people living in the malarious areas of Thailand have a high degree of tolerance to pain and inconvenience caused by morbidity in that many rural people never feel completely well, and a minor case of malaria is not considered to be an urgent manner. However, they are carriers of the parasite during the entire period of infection and thus promote the transmission of the disease.

B. Activities of the Malaria Division

Malaria treatment, as offered through the Malaria Division treatment facilities, is an exception to the general practice of charging for governmental sponsored services. Malaria diagnosis and treatment is free. One of the results partially attributable to no-fee treatment is an estimated utilization rate in excess of 50% for the nation's malaria victims. (In 1977 there were 317,000 reported cases of malaria in Thailand although private drug imports indicate that 300,000 additional cases of malaria may have been treated in the private Exact figures are elusive as persons seeking out the private

sector for treatment have not been identified nor studied by project planners. Private sector utilization seems to be more complex than convenience and/or treatment accessibility.

Several other observations concerning malaria control in Thailand are:

1. Insecticide Spraying - House spraying rates for malaria range from 30% to 80% throughout the country. If the coverage is near the low end of the scale there is question as to its effectiveness and even an 80% coverage rate does not insure a break in the transmission cycle. The question is often asked as to why the acceptance rates for spraying are so low. The following reasons have been identified:

a. Spraying is messy, inconvenient and the finished product unattractive.

b. Villagers feel that spraying has been going on for about 20 years in many areas and there is still malaria, so what is the use; or, they see that no malaria cases are in the village when spray teams come so why do it;

c. Homeowners say that spraying (with DDT) increases cockroach and bedbug infestation.

d. Thatched roofing rots faster without spraying as the fly that eats the caterpillar that eats the thatch are killed but the caterpillar isn't;

e. Villagers say that DDT kills cats (through constant licking of their feet) thus allowing the rat population to increase;

f. Spraying will offend the house spirits for some hilltribe residents;

g. In many rural areas or in temporary houses one cannot find four walls to spray;

h. The steadily increasing standard of living throughout Thailand makes spraying more and more unattractive. (Why would a new home owner, or any home owner, want white streaked powder on a newly constructed and polished mahogany wall?);

i. In Moslem areas there is resistance to having unknown men in houses with unattended females and all of the spraypersons are men;

j. In silk worm raising areas, silk farmers say that DDT kills the worms thus drastically affecting income;

k. Acceptance of house spraying is not necessarily commensurate with incidence of the disease as spraying has not been proven a deterrent (in villager's eyes) in the past - there still is malaria. Also as spray coverage is reduced malaria incidence probably will increase thus further encouraging non-acceptance of spraying in rural areas;

l. Drug administration is more available now allowing for easy curative treatment rather than inconvenient preventive treatment methods.

2. Field Personnel - An additional set of problems associated with spraying centers around the spray-persons. Several are mentioned below:

a. Spraying houses is boring, thus spraypersons lose interest quickly;

b. Spraypersons work 60 days straight during the spray season which is the hot season of the year, i.e. it is hard work;

c. Spraypersons are part-time employees;

d. If people do not want to let you in their house it is not in the Thai cultural patterns to insist on being accommodated;

e. The fiscal resources to finance per diem costs in the operational program have been limited for the past five years thus providing a disincentive for field work as salary must be used for field support of the sprayperson in addition to a separate household maintained for his family;

f. Terrorist activities in some areas of the country have reduced sprayperson motivation (10 malaria workers have been killed since 1974 while on duty - although not necessarily as a result of being malaria workers but because workers have been wearing khaki uniforms).

3. Drug Treatment - Malaria treatment is also a difficult problem in the Malaria Division's control efforts. Many people, particularly those receiving care from the private sector (hence paying for their medicine) do not take the full cycle of malaria medication. Once the symptoms are gone, medication ceases; however, they can still be reservoirs for malaria transmission even though asymptomatic. In addition, some pharmacists are reluctant to give full dosages of drugs in an effort to reduce the possibility of side-effects thus reducing business through poor publicity. The third factor that becomes important in drug treatment is the packaging of the pharmaceuticals so that one can easily remember to continue the medication for the proper amount of time. (The Malaria Division has already begun focusing on this item in their drug treatment program).

4. Health Education - The Malaria Division has had a recent history of very poor reception for their malaria education efforts. Several malaria educators in rural areas have been stoned, and equipment has been destroyed due to the frustration of villagers in seeing and hearing the same old anti-malaria materials. The hostility may also be a demonstration of the dissatisfaction with the malaria control program, hence the attempt of this project to bring diagnosis and treatment closer to the people with the disease.

5. Patient Identification - The migratory patterns of rural residents preclude the successful administration of a malaria control program follow-up system. Individuals covered through spraying in a rural house may spend the bulk of their week in the forest with no protection and are easy target for the vector. Drug prophylaxis may be too expensive for the individual - as well as the Thai Government on a large scale - hence the growing rates of malaria incidence. In addition, there is also extensive travel between the neighboring countries on Thailand's border-three of which have no organized malaria control program.

6. Community Participation - One of the ways to monitor malaria control activities as well as identify possible malaria cases is through community participation. The Malaria Division has employed community malaria workers in the past (collaborators and communicators), and they have been effective in slide generation and some educational work. With an improved educational and training component for community workers, the program for community participation can

be made more effective, and the Malaria Division may be able to overcome some of the resistance to spraying in addition to being able to follow-up and establish contact with potential malaria patients.

7. Malaria Division Morale and Motivation - The history of funding for the Malaria Division has had an interesting sociological impact on the morale of the unit. During the period in the 1960's and early 1970's when malaria activities were heavily supported by USAID, money was available, malaria was recognized as one of the important diseases in the country, and line activities were supported by donor fiscal resources. However, in 1972 when USAID discontinued support, the line activities formerly supported by outside donors were not picked up immediately in the RTG budget. This caused fiscal shortages for field operations and a commensurate decrease in the morale of the Division - although the field personnel seem to be extremely dedicated and committed considering the lack of support for all facets of the program. It is extremely important that future donor support not be funnelled into direct line activity support in order to preclude the recurrence of events following the withdrawal of funds by USAID in 1972.

V. Plan of Action for Dealing with Social Issues of Malaria Control

The AID funded malaria effort has two major components that will allow for better service to be given to rural persons suffering from malaria:

- Service facilities will be moved closer to rural residents where the bulk of transmission occurs; and,

- Community volunteers will be used to bridge the gap between government malaria workers and service recipients.

The location of disgnostic and treatment centers in malaria control sectors will not only make service more accessible, but it will also preclude the need for follow-up as slide identification will be done on the spot and the drug intervention will be distributed before the person leaves the clinic. In addition, the village volunteers will be able to identify those people who have been exposed to malaria transmission because of their profession thus allowing the village malaria visitor to focus his or her efforts on the prime candidates for the disease. If a village malaria worker from the government is not available, the volunteer will be trained in slide generation, and then once a positive diagnosis is obtained from the malaria office at the sector level the treatment

can be distributed by the volunteer in the village.

In addition the improvement of transportation and training facilities will allow for close contact to be maintained between all levels of the system so that a united force can be brought to bear on the malaria problem. AID will be able to monitor the project through the technical assistance field force located at the training facility and also located with the field units in the sectors. If additional problems arise, there is money available for technical consultation; and the initial evaluation in 1980 should indicate the progress of the program and identify those areas that need modification.

If the proposed approach is effective, the same structure will be incorporated in the next five year plan of the Malaria Division either entirely or in modified form. During the past few years the Malaria Division has been experimenting with sector level clinics very successfully, and the expansion of this approach is expected to increase case rates seen through governmental services thus insuring that quality care is given to more people. In addition, the availability of better care on a faster basis will reduce the length of malaria morbidity as well as drastically reduce mortality due to the disease.

VI. Spread Effect of Newly Introduced Practices

The spread effect is discussed in the body of the paper and in section V of this report. The malaria rates in Thailand have been increasing for the past five years and the country must identify methods of control to augment traditional approaches. It is thought that a wide spread test on decentralization of malaria identification and treatment, quick service, community participation and effective administrative control at all levels of the organization will yield the desired results. In addition, the USAID sponsored effort will focus on private sector involvement thus bringing all available resources to bear on the malaria control problem. The Malaria Division has both the technical competence and the motivation to adopt and institutionalize change; however, because of the seriousness of the malaria control problem it wants to be absolutely sure that the methods suggested to augment to program are both effective and affordable.

VII. Social Impact or Distribution of Benefits

The reduction of malaria in the rural border areas of Thailand will have a significant social impact. Malaria is a disease that focuses on the poor rural inhabitants with the

least access to medical services. Farmers, miners, and foresters who are forced to leave their permanent home in search of employment are the most prone to contracting the disease. The ability of these people to provide for their families is based on their physical well-being and malaria drastically effects an individual's earning capacity. The malaria control intervention proposed is aimed at low income persons living in rural areas and will have a dramatic effect on improving their quality of life.

This project is focused on border and hilly areas because these areas have the highest degree of malaria endemecity. Local peoples are primarily subsistence agriculturalists or unskilled rural laborers. These are also the areas where poverty in Thailand is most severe, and the poorest groups in Thailand are found in malaria control areas where this project will concentrate. (E.g. the lower hill areas of North Thailand inhabited by Karen Swiddeners who are probably among the poorest in Thailand.) Morbidity contributes to poverty incidence in that labor is lost for periods ranging from several weeks to several months per household per year. Although specific data is unavailable on how much labor down-time could be reduced due to reduction in malaria incidence, in the target areas this would probably be significant (malaria incidence is highest at just that time of year - during the wet growing season - when labor is most needed). Reduction of malaria incidence in these areas should thus be of direct economic benefit to the Thai rural poor.

ANNEX I-1

Description of Malaria Division Sections and Regional Organization

General Management Section

The general management section, being responsible for the logistical support of the Malaria Division and maintenance of the physical plant, is sub-divided according to functions into administration, personnel, transportation, finance, and equipment and supplies sections.

Training and Public Information Section

The training and public information section (formerly called health education and training) plays an intergal role in the malaria program, being responsible for the National Malaria Training Center, national and international meetings and seminars, and directing the activities of the regional training and public information sections. Each region's mobile public information team employs various audio-visual methods in their work at the village level throughout the country. Examples include movies, slide shows, folk dances presented on village temple grounds, informal group discussions and school presentations involving flip charts and student participation. In addition, they provide materials such as posters, leaflets, and plastic school bags for distribution. The public information section also works closely with the malaria zone offices in developing public service announcements which are disseminated through various communication media, e.g. television, radio, newspapers.

The National Malaria Training Center in Phrabuddhabat (140 km from Bangkok) provides regular pre-service training courses for sector chiefs (18 months), and microscopists (2 months), while in-service training courses are also conducted for microscopists, sector chiefs, and zone chiefs. In addition, specific technical training courses and seminars are provided as required, some with WHO assistance in entomology, epidemiology, health education, bioenvironmental methods of malaria control, and for refresher training. An annual meeting is held for all zone chiefs and assistant zone chiefs, and for all sector chiefs and assistant sector chiefs, at which instruction is given by, and discussions are held with, the senior headquarters staff. At regional and zone levels, pre-service training includes courses for spray squad chiefs and spraymen, surveillance squad chiefs and house visitors, and voluntary groups such as malaria collaborators and communicators who work and live in rural villages. In-service training consists of monthly zone and sector chiefs meetings, refresher courses

for sector chiefs, surveillance personnel, microscopists, mechanics, entomological workers, administrators, and other courses for medical students, nurses, health workers, and Buddhist monks. Information on results of public information and training is attached.

Vector Control Operations Section

The vector control operations section concentrates on reducing vector population and vector longevity there by creating a situation where there is a reduction or prevention of morbidity and mortality from malaria. The bulk of vector control operations at present is concerned with the spraying of DDT 75% wettable powder at a dosage of 2 grams per square meter to interrupt transmission in highly endemic areas, with one or two cycles per year, depending on epidemiological characteristics of the area. This section is responsibile for geographical reconnaissance and mapping, provision of all equipment, supplies, and insectides needed for spraying operations, planning of spraying schedules, and supervision of spraying procedures. In addition to DDT spraying, Bio-environmental measures such as larviciding, use of larvivorous fish, drainage, land fills, flushing, and space spraying (ULV and/or thermal fogging) are being used in field trails whenever and wherever feasible. In conjunction with the Epidemiology and Entomology sections, WHO conducts Epidemiological and operational evaluations in order to determine appropriate control measures. The Vector Control Operations section is responsible for the implementation and subsequent assessment of vector control measures.

Epidemiology Section

In the Epidemology section the vast amount of statistical information derived from sectors, zones, and regions is analysed and evaluated in order to form an accurate picture of the changing epidemiological situation and to formulate proposals to respond to particular needs. Regional investigation teams are sent to problem and epidemic areas to conduct epidemiological evaluations, such as on morbidity, mortality, and parasite rates, and then to make recommendations to zone level personnel for appropriate remedial measures. In the area of surveillance, this section monitors and coordinates the taking and collecting of blood slides by malaria house visitors, hospitals, rural health services, and voluntary collaborators.

Entomology Section

The Entomology Section has teams at national, regional, and zonal levels to study the prevalence and habits of principal, secondary, and suspected malaria vectors in Thailand. Entomological observations are conducted in selected index villages in Control areas, while insect collecting teams and special study groups work in all operationally phased areas according to the epidemiological situation and the need for correlative entomological data. These activities consist of man-biting collections, light trap collections, dissections for parous rates of vectors and sporozoite rates of suspected vectors, and DDT susceptibility tests on vectors and suspected vectors. The entomology section is also involved in lab tests and field trials of larvicides, larvivorous fish, larvivorous plants, and other bioenvironmental control measures.

Laboratory Services Section

Fully-equipped laboratories are located at national, regional, and zonal levels, while special microscopists are placed in malaria clinics in certain sector offices in highly endemic areas. Each microscopist has completed a 2 month training course and examines approximately 70 blood films per day through-out the year, with higher or lower averages depending on the transmission season. 10% of the negative slides examined at the zone level and all the positives are sent to the regional lab for checking. At the regional lab 25% of the positives and 1% of the negatives are sent to the national lab before being checked, while the remaining 75% of positives and 9% of negatives are checked for accuracy, with 10% of all checked slides mixed and sent to the national lab for re-checking. Records are kept of the quantity and accurately of performance of each individual microscopist. The microscopists also aid in the taking of blood slides at Malaria Clinics located at hospitals, sector offices, regional offices, and national headquarters. The laboratory chiefs are responsible for notifying the zone and sector offices of positive fever cases to be followed up and treated, while individual microscopists enter each positive case in the case register at zone offices.

Research Section

The Research Section is responsible for conducting applied research, that is research directed towards solving specific problems, the end result of which will be directly applied in the field. This section also coordinates research carried out by other institutions, which is a mixture of basic and extensive applied research often involving field studies and trials, sometimes in collaboration with the Malaria Division. Studies have been completed on the responses of A. Balabacensis and A. minimus to DDT regional spraying, on the use of light traps for sampling the malaria vector population, and on the effects of various treatment regimens in use especially the 5 day treatment of P. vivax. Currently under study is the use of fish for the control of larvae, the utilization of a low cost slow release insecticide for mulation for mosquito larvaecontrol, the use of mass drug administration in an isolated forest village for the control of malaria, the long term effects of DDT spraying, the development of a cost effective malaria case detection and monitoring system, and a survey to determine the geographical distribution and extent of Chloroquine resistant strains of P. falciparum throughout the country. In collaboration with Mahidol University studies are in progress on different treatment regimens for P. vivax and P. falciparum.

Results of Public Information

	1976	1977
Movies (#of showings/#of viewers)	123/46,030	107/43,770
School Presentations (#of times/#of students)	232/37,941	2,433/45,640
Newspaper Coverage (#of times)	18	150
Radio Coverage (#of times/# of stations)	61/30	541/189
Television Coverage (#of times/#of stations)	67/6	138/28
Exhibitions (#of times/#of people)	6/12,500	64/235,286
Leaflets Printed (#of sheets)	200,000	-

Results of Training

Type of Training	Number of perople trained	
Pre-Service	1976	1977
Sector Chief	10	183
Microscopists	37	14
Spraymen and squad chiefs	3,580	6,696
Surveillance workers	336	-
Voluntary collaborators	953	2,642
Voluntary communicators	678	1,789
In Service		
Zone chiefs and section chiefs	65	160
Sector chiefs and assistants	644	1,368
Health education workers	17	21
Microscopiests	104	15
Entomology workers	17	45
Other malaria workers	1,435	1,195
Voluntary collarborators	770	-
Non-Malaria Personnel	6,949	2,226

VACANCIES

Positions	Central	Region 1 Prabud-dhabad	Region 2 Chiang-mai	Region 3 Khon-Kaen	Region 4 Song-kla	Region 5 B'kok	Total
Doctor 7	3	1	1	1	1	1	8
Doctor 4 (1)	(3)	(3)	(2)	(1)	(1)	(1)	1(11)
Admin. officer 5	1	1	-	-	-	-	2
Admin. officer 4	1	-	-	-	-	-	1
General services 4	1(1)	(1)	(1)	1	1	(1)	3(4)
General services 3	5	-	1	1	1	1	9
General services 2	(2)	-	-	-	-	-	(2)
General services 1	5	(7)	(5)	(6)	(5)	(7)	5(30)
Typist 1	1	1	1	1	1	1	6
Typist 2	(1)	-	-	-	-	-	(1)
Mechanic 3	2	1	2	2	1	1	9
Mechanic 2	-	1	-	-	1	1	3
Financial official 4	(1)	-	1	-	1	1	3(1)
Financial official 3	1	-	1	1	-	-	3
Financial official 2	1	1	-	-	-	1	3
Financial official 1	(1)	5(3)	(2)4	3(4)	1(5)	1(7)	12(24)
P.H. official 6	-	1	1	(1)	1	1	4(1)
P.H. official 5	1	10	8	6	7	10	42
P.H. official 4	3(1)	5(3)	7(1)	2(6)	3(2)	6(4)	26(17)
P.H. official 3	-	34	34(2)	31(1)	27(1)	34(2)	161(6)
P.H. official 2	-	20(1)	20(1)	19(1)	23(3)	10(4)	92(10)
P.H. official 1	1	32(45)	40(42)	69(19)	47(33)	42(35)	231(174)
Med.Science official 5	1	1	-	-	-	1	3
Med. Science official 4	1(1)	-	(2)	(1)	-	-	1(4)
Med. Science official 3	-	-	-	1	-	-	1
Health education technician 6	1	-	-	-	-	-	1
Health education tech. 5	2	-	-	-	-	-	2
Health education tech. 5	(1)	-	-	-	-	-	(1)
Ento. official 5	1	1	-	-	-	-	2
Ento. official 4	2	-	-	-	-	-	2
Ento official 3	1	1	1	1	1	1	6
Draftman 2	1(1)	-	-	-	-	-	1(1)
	36(13)	116(62)	120(60)	139(40)	117(50)	114(61)	642(256)

- Vacancies are shown in brackets
- Filled positions are next to the bracketted vacancies

Annex J-1

Thailand - Anti-Malaria Project Certification Pursuant to Section 611(e) of the Foreign Assistance Act of 1961, as Amended

I, Donald D. Cohen, principal officer of the Agency for International Development in Thailand, having taken into account among other things the maintenance and utilization of projects in Thailand previously financed or assisted by the U.S. and the commitment of the Royal Thai Government to carry out an effective malaria control program, do hereby certify that in my judgement Thailand has the financial and human resources capability to implement, maintain, and utilize effectively the subject anti-malaria project.

Date June 30, 1976

Donald D. Cohen
Director, USAID/Thailand

ANNEX L

CHECKLIST OF STATUTORY CRITERIA

Thailand
Anti-Malaria Project
May 7, 1979

COUNTRY CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY	A. GENERAL CRITERIA FOR COUNTRY
1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent patterns of gross violations of internationally recognized human rights.	Yes.
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent controlled substance (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?	No.
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	Yes.
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has has exhausted available legal remedies and (b) debt is not denied or contested by such government?	No.

5. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or sub divisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities.	No.
6. FAA Sec. 620(a), 620(f); FY 79, App. Act Sec. 108, 114, 606. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola?	No; no.
7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	No.
8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?	No.
9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility, or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	An agreement is in effect.

10. FAA Sec. 620(o): Fishermen's Protective Act of 1967, as amended, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters,	Thailand has not taken any such action.
a. has any deduction required by Fishermen's Protective Act been made?	
b. has complete denial of assistance been considered by AID Administrator?	
11. FAA Sec. 620(q): FY 79 App. Act Sec. 603.	
a. Is the government of the recipient country in default on interest or principal of any AID loan to the country?	No.
b. Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds.	No.
12. FAA Sec. 620(s). If contemplated assistance is development loan or from Economic Support Fund, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems? (An affirmative answer may refer to the record of the annual "Taking Into Consideration" memo: "Yes, as reported in annual report on implementation of Sec. 620(s)." This	Yes, as reported in annual report on implementation of Sec. 620(s).

report is prepared at time of approval by the Administrator of the Operational Year Budget and can be the basis for an affirmative answer during the fiscal year unless significant changes in circumstances occur.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? — No.

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget? — Current.

15. FAA Sec. 620A: FY 79 App. Act, Sec. 607. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of terrorism? — No.

16. FAA Sec. 666. Does the country object on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA? — No.

17. FAA Sec. 699, 670. Has the country, after August 3, 1977, delivered or received nuclear reprocessing or enrichment materials or technology, without specified — No.

arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977, although not a "nuclear-weapon state" under the non-proliferation treaty?

B. FUNDING CRITERIA FOR COUNTRY

FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(b)(4). Have criteria been established and taken into account to assess commitment and progress of country in effectively involving the poor in development on such indexes as: (1) increase in agricultural productivity through small-farm labor intensive agriculture (2) reduced infant mortality, (3) control of population growth, (4) equality of income distribution, (5) reduction of unemployment, and (6) increased literacy?

Yes.

b. FAA Sec. 104(d). If appropriate is this development activity designed to build motivation for smaller families through modification of economic and social conditions supportive of the desire for large families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to

Not appropriate.

urban poor? Are problems of malnutrition, disease, and rapid population growth addressed by coordinated assistance?

CHECKLIST OF STATUTORY CRITERIA

PROJECT CHECKLIST

A. GENERAL CRITERIA FOR COUNTRY	A. GENERAL CRITERIA FOR COUNTRY
1. FY 79 App., Unnumbered; FAA Sec. 653(b); Sec. 634A.	
(a) Describe how Committees on Appropriation of Senate and House have been or will be notified concerning the project;	Notification in process.
(b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure?)	Yes.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the United States of the assistance?	Yes.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No such action required.
4. FAA Sec. 611(b); FY 79 App. Act, Sec. 101. If for water or water-related land resource construction, has the project met the standards and criteria as per the principles and standards for planning water	N/A

and related Land Resources dated October 25, 1973?

5. FAA Sec. 611(e). If project is Capital Assistance, and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project? — Yes.

6. FAA Sec. 209. Is project susceptible of execution as part of a regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. — No.

7. FAA Sec. 601(a). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions. — This project is not designed to encourage such efforts.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise). — Most of the offshore procurement financed under this project is expected to be manufactured in the U.S.

9. FAA Sec. 612(b); Sec 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services.	The Thai contribution to malaria control is estimated to be the local currency equivalent of $25 million. There is no U.S. owned local currency available for this project.
10. FAA Sec. 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release?	No.
11. FAA Sec. 601(e). Will the project utilize competitive selection procedures for the awarding of contracts, except where applicable procurement rules allow otherwise?	Yes.
12. FY 79 App. Act Sec. 608. If assistance is for the production of any commodity for export, is the commodity likely to be in surplus on world markets at the time the resulting productive capacity becomes operative, and is such assistance likely to cause substantial injury to U.S. producers of the same, similar or competing commodity?	N.A.
B. FUNDING CRITERIA FOR PROJECT	FUNDING CRITERIA FOR PROJECT
1. Development Assistance Project Criteria	
a. FAA Sec. 102(b); 111; 113; 281 (a). Extent to which activity will: (i) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive	By reducing malaria in rural Thailand this project will have a direct impact on the quality of life and income earning potential of the rural poor. Community participation will be elicited during pilot activities aimed at developing local malaria volunteer workers.

production and the use of appropriate technology, spreading investment out from cities to small towns and rural areas, and insuring wide participation of the poor in the benefits of development on a sustained basis, using the appropriate U.S. institutions; (ii) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward a better life, and otherwise encourage democratic private and local governmental institutions; (iii) support the self-help efforts of developing countries; (iv) promote the participation of women in the national economies of developing countries and the improvement of women's status; and (v) utilize and encourage regional cooperation by developing countries?

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: (include only applicable paragraph: e.g., a, b, etc.,—which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source).

(1) (104) for population planning under 104(b) or health under 104 (c); if so, extent to which activity emphasizes low-cost, integrated delivery systems for health, nutrition, and family planning for the poorest people with particular attention to the needs of mothers and young children, using paramedical and auxiliary medical personnel, clinics, and health posts, commercial distribution systems and other modes of community research.

This project is specifically designed in part to extend integrated malaria services to rural areas. See description of project for details.

c. FAA Sec. 110(a). Will the recipient country provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived under Sec. 124(d) "relatively least-developed" country)?	The RTG is expected to provide at least $25 million equivalent compared to the U.S. contribution of $4.5 million for malaria control activities during the life of the project. Assurances to this effect will be included in the project agreement.
d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing or is recipient country "relatively least developed?"	No.
e. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	Alleviation of malaria will have a major effect on the development capacities of Thailand's people. Thailand's intellectual and institutional resources will be used and developed during project implementation. Local participation and implementation are stressed.
f. FAA Sec. 122(b). Does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities and self-sustaining economic growth?	The project will significantly contribute to productive capabilities and economic growth in rural areas through the reduction of malaria. It will directly contribute to rural development activities by reducing the threat of malatia.
2. Development Assistance Project Criteria (Loans Only)	
(a) FAA Sec. 122(b). Information and conclusion on capacity	Thailand has a healthy reserve of foreign currency and has the capa-

	of the country to repay the loan, including reasonableness of repayment prospects.	city to repay the loan.
(b)	FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?	Assistance is not for a productive enterprise.

ANNEX M

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS PART I

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PAF

2. DOCUMENT CODE: 5

3. COUNTRY ENTITY: Thailand

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 493-0305

6. BUREAU OFFICE: A. SYMBOL: ASIA; B. CODE: 04

7. PROJECT TITLE (Maximum 40 characters): Anti-Malaria

8. PROJECT APPROVAL DECISION: ACTION TAKEN: A (A = APPROVED, B = DISAPPROVED, C = DEAUTHORIZED)

9. EST. PERIOD OF IMPLEMENTATION: 03 | 1

10. APPROVED BUDGET AND PROJECTED FY 1980 OBLIGATIONS

A. APPROP. SYMBOL	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE		E. FY 80		F. LOM	G. 3RD	
		C. GRANT	D. LOAN	GRANT	LOAN	GRANT	GRANT	LOAN
1 PSH	S 514	542	542	500	4,000			
2								
3								
4								
TOTALS				500	4,000			

A. APPROP. SYMBOL	H. 4TH FY ___		I. 5TH FY ___		J. FY OF PROJECT		PROJECT FUNDING AUTHORIZED	GRANT	LOAN
	GRANT	LOAN	GRANT	LOAN	GRANT	LOAN	ENTER APPROPRIATE CODE: 1 = FY OF PROJECT, 2 = INCREMENTAL FY OF PROJECT		
1 PSH					500	4,000		1	1
2									
3									
4									
TOTALS					500	4,000	PROJECT FUNDING AUTHORIZED THRU	FY 8	

12. INITIAL PROJECT FUNDING ALLOTMENT REQUESTED $000

A. APPROPRIATION	B. ALLOTMENT REQUEST NO. ___	
	C. GRANT	D. LOAN
1 PSH	500	4,000
2		
3		
4		
TOTALS	500	4,000

13. FUNDS RESERVED FOR ALLOTMENT

TYPED NAME (Chief, SER. FN FSD)

SIGNATURE

DATE

14. SOURCE ORIGIN OF GOODS AND SERVICES: [ ] 000 [ ] 941 [ ] LOCAL [X] OTHER See Part II

15. FOR AMENDMENTS, NATURE OF CHANGE PROPOSED

ii

FOR SOCIAL USE ONLY	16. AUTHORIZING OFFICE SYMBOL	17. ACTION DATE (MM / DD / YY)	18. ACTION REFERENCE (Optional)	ACTION REFERENCE DATE (MM / DD / YY)
	AA/ASIA			

AID 1330-6 (10-79)

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

THAILAND

Anti-Malaria Project
A.I.D. Project No. 493-0305

Pursuant to Part I, Chapter 1, Section 104 of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Loan and a Grant to the Kingdom of Thailand, the "Cooperating Country," of not to exceed Four Million Five Hundred Thousand United States Dollars ($4,500,000) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph:

The project ("Project") is designed to assist the Royal Thai Government (RTG) in developing the capability of the Malaria Division of its Ministry of Public Health, Department of Communicable Disease Control, to provide and maintain adequate malaria control services in Thailand's endemic malaria areas of high risk. The Project will concentrate on relieving key constraints to control activities in priority areas which have a total population of more than 8 million predominantly poor rural people. Principal uses of Project funds will be to (1) develop and strengthen the institutional capability of the Malaria Division to enable it better to meet the demands of malaria control in the country; (2) to enable the Malaria Division to test new approaches to malaria control so that they can be incorporated in the next five-year plans of operations of the Malaria Division and of the World Health Organization (WHO); and (3) to support new activities of the RTG anti-malaria effort which do not supplant ongoing efforts.

Of the Authorized Amount, Four Million Dollars ($4,000,000) ("Loan") will be loaned to the Cooperating Country to assist in financing certain foreign exchange and local currency costs of goods and services required for the Project and the remaining Five Hundred Thousand Dollars ($500,000) ("Grant") will be granted to the Cooperating Country to assist in financing certain foreign exchange and local currency costs of goods and services required for the Project including technical advisory services, evaluation and health education, software and materials. The entire amount of the A.I.D. financing herein authorized for the Project will be obligated when the Project Agreement is executed.

I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and major conditions as A.I.D. may deem appropriate:

1. Interest Rate and Terms of Repayment

The Cooperating Country shall repay the Loan to A.I.D. in United States Dollars within forty (40) years from the date of first disbursement of the Loan, including a grace period of not to exceed ten (10) years. The Cooperating Country shall pay to A.I.D. in United States Dollars interest from the date of first disbursement of the Loan at the rate of (a) two percent (2%) per annum during the first ten (10) years, and (b) three percent (3%) per annum thereafter, on the outstanding disbursed balance of the Loan and on any due and unpaid interest accrued thereon.

2. Source and Origin of Goods and Services

Except for ocean shipping, goods and services financed by A.I.D. loan funds under the Project shall have their source and origin in the Cooperating Country or in countries included in A.I.D. Geographic Code 941, and goods and services financed under the Grant shall have their source and origin in the Cooperating Country or in the United States, except as A.I.D. may otherwise agree in writing. Ocean shipping financed under the Loan shall be procured in the United States or the Cooperating Country, and ocean shipping financed under the Grant shall be procured in the United States, except as A.I.D. may otherwise agree in writing.

3. Waivers

The following waivers to A.I.D. regulations are hereby approved:

(a) A proprietary procurement waiver, under Handbook 11, 3C9, for Hudson Co. sprayers and Spray Systems Co spray nozzles in order to assure the interchangeability and standardization of equipment;

(b) A waiver under Foreign Assistance Act, Section 636(i), to permit the establishment by the Malaria Division of a credit facility which will enable employees to acquire and to use in their work motorcycles produced in Thailand. Arrangements for this facility will be to the satisfaction of USAID. It is expected that the facility will finance or assist in the financing of approximately 400 such motorcycles initially, with additional such motorcycles being financed by the facility in the course of its operations.

ANNEX H-1

PROJ: 493-005

UNITED STATES ARMY MEDICAL COMPONENT
ARMED FORCES RESEARCH INSTITUTE OF MEDICAL SCIENCES
APO SAN FRANCISCO 96346 — RAJVITHI ROAD, BANGKOK, THAILAND

Date Received
21 FEB 1979

IN REPLY REFER TO:
SGRD-UWQ

5 February 1979

ACTION TO: [illegible]
DUE DATE: 2-28-79
ACTION TAKEN: Letter
INITIAL: [illegible]
DATE: [illegible]

MEMORANDUM OF INFORMATION AND UNDERSTANDING

SUBJECT: AFRIMS Role in USAID Support of the National Malaria Eradication Project

DISTRIBUTION

ADT	NEA
D	✓
D P M	✓
EXO	✓
D [illegible]	✓
DIRDS	✓
D [illegible]	
D [illegible]	✓
D [illegible]	
[illegible]	
EMB	
DAR	✓

1. The Armed Forces Research Institute of Medical Sciences (AFRIMS) was established by bilateral diplomatic agreement on 1 July 1976, following the disestablishment of the Southeast Asia Treaty Organization. The US Army Medical Component within the Institute remained a special foreign activity of the Walter Reed Army Institute of Research, Washington, D.C., drawing its budget and the larger proportion of its American staff from that organization. The mission of the US Army Medical Component continues to be research in tropical and subtropical diseases of military and civilian public health importance in Asia. Malaria research has occupied a prominent place within the research program since the Laboratory's establishment as evidenced by the attached bibliography. Additional information on the Laboratory's activities is available in the annually published, widely distributed Annual Progress Report (attached). All of the work conducted by the Laboratory is contained in this Report.

2. At present, malaria research is conducted by the Departments of Medicine, Epidemiology, Medical Entomology, and Veterinary Medicine. Projects presently underway include work in testing of investigational new antimalarials, in cell-mediated immunity in malaria, in malaria parasite cultivation, in malaria transmission, and in mosquito vector taxonomy and efficiency. These efforts are carried out in collaboration with personnel of the various Provincial Hospitals, National Malaria Eradication Project, and the Faculty of Science, Mahidol University. Projects requiring studies of human subjects are approved at the Ministry of Public Health level. There is every expectation that the current level of laboratory-wide effort will be supported and maintained into the near-and mid-term.

ATTACHMENTS TO: 0/ltr 3.

SGRD-UWQ

SUBJECT: AFRIMS Role in USAID Support of the National Malaria Eradication Project

5 February 1979

3. The US Army Medical Component has been requested and has agreed to assist the USAID, in coordination with the WHO advisory staff, in the following areas:

Review of NMEP proposals for priority and feasibility; technical advice on equipment and supply selection, laboratory methodology selection, and education and training of NMEP personnel; the review of progress for conformity to research protocols, identification of problem areas, field review of projects when appropriate; evaluation of the acceptability of reports and recommendations for continuance of support. The US Army Medical Component agrees to carry out the above activities at no cost to the USAID with the exception of reimbursement for educational and training materials provided personnel of the NMEP and travel and per diem expenses necessary to visit field project areas. The US Army Medical Component further agrees that if problems arise outside its areas of expertise it will identify them to USAID and suggest suitable, USAID funded consultants.

HERBERT E. SEGAL, M.D.
LTC, MC
Director

Distribution

June 29, 1979

ASIA/PD/EA, M. K. Sinding

THAILAND: Anti-Malaria Project Paper (493-0305)

Attached is a copy of subject Project Paper as revised and authorized by A/AA/ASIA 12 June 79.

Attachment: a/s

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