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CAPITAL ASSISTANCE PAPER

PAKISTAN - MALARIA ERADICATION PROGRAM

Attachment to
 TO AID A 2682

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PAKISTAN MALARIA ERADICATION PROGRAM

SUMMARY AND RECOMMENDATIONS

I. Borrower

President of Pakistan. The Borrower's representative will be the Malaria Eradication Board of the Government of Pakistan. ✓

Amount

\$10.4 million. ✓

Loan

The period of repayment shall be forty (40) years, with provision for a ten (10) year grace period. The interest shall be three-quarters of one per cent ($3/4$ of 1%) for the first ten (10) years and two per cent (2%) per annum thereafter.

Total Cost of Activity

The total cost of the fourteen (14) year Malaria Eradication Program for which the commodities to be financed under this loan will be used, is estimated to be \$137.8 million, of which \$36.0 million is required in foreign exchange and \$101.8 million is local currency.

Total estimated cost of the Program in 1964-65 is \$13.5 million consisting of \$5.1 million in foreign exchange and \$8.4 million in local currency. The total cost for the year 1965-66 is \$15.8 million, consisting of \$5.3 million in foreign exchange and \$10.6 million in local currency.

Description of Activity

The Program will finance the dollar costs of importing commodities including DDT, sprayers, automotive equipment, scientific instruments and chemicals required in the execution of the Pakistan Malaria Eradication Program during 1964-65 and 1965-66.

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Purpose of Activity

The purpose of this program is to eliminate malaria from the entire country and prevent its reintroduction. Malaria Eradication will be implemented by successive stages and is scheduled to last a minimum of 14 years from 1960-61 to 1973-74.

Background of Activity

In 1958 the Government of Pakistan, with the assistance of the World Health Organization, began the preparation of the present program of malaria eradication. In August 1962, A.I.D. agreed to finance the foreign exchange requirements of the Malaria Eradication Program for 1962-63 from the general commodities Loan No. 53 in the amount of \$1.5 million. In February 1963, the first specific Malaria Eradication Loan was signed between the Government of Pakistan and USAID to provide \$3.8 million worth of foreign exchange assistance for 1963-64. The present loan application covers the foreign exchange requirements of the program for 1964-65 and 1965-66 in the amount of \$10.4 million.

Ex-Im Bank Interest

Mission Views

USAID/Pakistan recommends early approval of this loan.

Statutory Criteria

All statutory criteria have been met. ✓

Recommendation

Authorization of a loan to the President of Pakistan for an amount not to exceed \$10.4 million. ✓

(a) Terms: Period of repayment shall be forty (40) years with provision for a ten (10) year grace period;

(million)
1.5
3.8
<hr/>
5.3 ^{to date}
10.4
<hr/>
15.7 ^(to 1966)

- (b) Interest Rates: Three-fourths of one per cent (3/4 of 1%) per annum on the outstanding balance of the loan for the first ten (10) years and two per cent (2%) per annum thereafter;
- (c) Repayment Terms: The interest and principal shall be paid in United States Dollars;
- (d) All equipment, materials and services financed under this loan shall have their source and origin in the United States.

Capital Activity Committee Members:

Loan Officer: Dennis P. Barrett

Malaria Advisor: Arthur S. Kidwell ✓

Counsel: Robert L. Bard

Drafting Officers: D.P. Barrett, USAID/Pakistan - 3/5/64

A.S. Kidwell, USAID/Pakistan - 3/5/64

II. Background for Malaria Eradication

A. Definition

Malaria eradication means the extermination of the malaria parasites of man in the population of a large area. It does not mean the eradication of the species of mosquitoes that transmit malaria in that area. The World Health Organization has given the following definition: "Malaria Eradication means the ending of the transmission of malaria and the elimination of the reservoir of infective cases, in a campaign limited in time and carried to such a degree of perfection that, when it comes to an end, there is no resumption of transmission" (World Health Organization, 1957).

The term eradication means to uproot. Malaria can be visualized as an infection having its roots — the malaria parasites — in the patient from whom an anopheles mosquito picks them up with the blood, when feeding on the subject and eventually transmits them to other human beings.

B. Characteristics and Requirements of a Malaria Eradication Program

There is today, among malariologists, a general consensus to support the malaria eradication policy. Its principles and practice have been enumerated by WHO in 1957. These principles have since been the basis for Malaria Eradication Programs and their implementation all over the world. A program of malaria eradication cannot be successfully implemented unless some preplanning requirements are fulfilled in the country to provide adequately for the following four phases: (1) preparation; (2) attack; (3) consolidation; and (4) maintenance of the achieved eradication. Each phase is equally important.

A malaria eradication program (M.E.P.) is characterized by the need for total coverage of all the malarious area, usually meaning the residual spraying with insecticides of all houses of the area; and by its strict time-limits which, if exceeded, would not only increase costs, but might also lead

to failure, should insecticide-resistance develop. Total coverage implies, in the preparatory phase, a geographical and topographical reconnaissance of all malarious territory, the mapping and numbering of all housing units to be sprayed; during the attack phase, it implies the periodical spraying of every house in such a way that its inner walls remain lethal to mosquitoes during the whole duration of the transmission season, requiring therefore that the spraying operations be carried out in the appropriate time and with the greatest efficiency. Only by such a total coverage in space, time and quality can that degree of perfection considered indispensable for eradication be attained. Total coverage does not end with the end of spraying operations; for it is just as imperative in the consolidation period when the spraying campaign is withheld and any case of malaria must be detected as soon as possible to prevent it becoming the source of renewed transmission.

The latest and most authoritative textbook on Malaria Eradication states:

"No other public health program shows the characteristics of the malaria eradication program. All of them have an ideal target, but if the implementation of the program fails to reach it in full, the enterprise may still be a successful achievement of public health. In malaria eradication programs any result of this kind would be a failure. A malaria control scheme or small pox vaccination may only reach 80 per cent of the population for which they had been planned because of scarcity of personnel, poor organization, or inadequate financing and administration. Still, either program might succeed in preventing a number of deaths and a great deal of illness. A malaria eradication program must prevent the very last case of malaria. There is no such thing as a partial success. Any progress short of bringing, and keeping, transmission at zero level is a failure.

"Consequently, no other public health program needs such a careful and complete planning and such an efficient and smoothly running administration. As insecticide-resistance develops from year to year, a malaria eradication program adopts an urgent character. Delays in the implementation will jeopardize success.

"Though primarily a responsibility of the health department of a country, a M.E.P. is a major program of national interest and an emergency one. It, therefore, needs the active and unstinted cooperation of all government departments. If a government is not aware of these needs, it should refrain from attempts at eradicating malaria or be prepared to fail in the attempt."
(Emilio Pampano, textbook on Malaria Eradication, April 1963).

In short, the basic elements of success are:

- (1) Totality of national coverage by the project.
- (2) The provision of staff, commodities and finances in full, at the right place, right time, and in the right amount.
- (3) The necessity for full-time dynamic administrative and professional guidance.
- (4) Priority support by the national government.

The success or failure of the program will depend entirely upon attention to details. This will require advance planning in regard to requirements, including full provision for commodities, transport, personnel and their training. Failure to coordinate these activities or to make timely provision of commodities may not only delay the project, causing avoidable expenditures, but may mean a failure of the program itself. The requirements are so uncompromising that partial satisfaction cannot guarantee success. Either all requirements are met in full and the program moves from one phase into another, or it will lead to a failure of all phasing and advance planning.

C. History of Pakistan's Malaria Eradication Program

For many years malaria control operations have been carried out in some localities of Pakistan. The U.S. Government financed support to these control operations between 1952 and 1958. ✓

In 1955, (World Health Assembly, Mexico City) nations of the world declared that malaria control operations should be converted to a concentrated effort to eradicate the disease. Soon thereafter all of Pakistan's neighbors ✓
~~undertook malaria eradication efforts.~~ The Government of Pakistan delayed its decision to undertake eradication and the U.S. foreign exchange support of the malaria control program was withdrawn in 1958. In that year, Pakistan, with assistance of the World Health Organization, began the preparation of the present program of malaria eradication. This effort was additionally assisted by UNICEF in the construction of a DDT plant at Nowshera and with other problems of supply. In the Second Five-Year Plan, published in June, 1960, Rs. 56 million were allocated to this long-range program and in June of 1961, the semiautonomous Malaria Eradication Board was established by the Government. ✓

In August 1962, A.I.D. agreed to include foreign exchange requirements of the Malaria Eradication Program for 1962-63 in the general commodities Loan No. 53 in the amount of \$1.5 million. In February 1963, the first specific Malaria Eradication Loan was signed between the Government of Pakistan and USAID to provide \$3.8 million worth of foreign exchange assistance for 1963-64. The present loan application covers the requirements of the Project for 1964-65 and 1965-66 in the amount of \$10.4 million.

Total success of Pakistan's Malaria Eradication Program depends upon continuous and systematic operation over a period of years until the disease is completely eliminated. A.I.D. is not committed, however, by the proposed approval of this loan to finance the import component of remaining ten (10) years of this

program although it can expect to be called upon for continued support, and will doubtless wish to render such support so long as the program is being properly carried out. There is also reasonable assurance that even if A.I.D. were to terminate its support, the program would be completed. Evidence of this is the extent of the GOP commitment to the program; an allocation is made for the support of the program in the Second Five-Year Plan; a semiautonomous Malaria Eradication Board has been established and provided with a nonlapsable fund; and Pakistan has executed a project agreement with WHO which extends over the period of the program as now planned and which states that Pakistan will arrange for necessary foreign assistance to complete the program. Furthermore, there are other sources of foreign credit since Pakistan's Five-Year Plan is receiving the support of a Consortium of aid-giving countries which includes the United States. As added assurance that the program will be completed, the loan agreement will state that it is the present plan of the Government of Pakistan to provide the necessary financing to complete the program, either by arranging financing from foreign lending agencies, or by providing foreign exchange from its own resources.

Similarly, because of its commitment to the Program, the Government of Pakistan will provide sufficient local currency to complete the Program.

For the reasons stated above, the financial planning for the Malaria Eradication Program satisfies the requirements of the FAA of 1963, as amended.

D. Progress to Date

West Pakistan

The Malaria Eradication Program in West Pakistan begins in the districts located on the Indian border and progresses over the contiguous areas covering a population of 9.1 million people. The total number of houses sprayed in 1963 was 1,718,379 with coverage of approximately 98 per cent in the districts of Sheikhpura, Sialkot, Gujranwala, Lahore and Lyallpur. These districts are recognized as highly malarious areas.

An initial survey conducted in 1961 showed that the malaria infection rate in these districts varied from 5 to 60 per cent prior to spraying operations. The estimated number of malaria cases based on the infection rate was fifty (50) thousand per one (1) million population. There has been a remarkable decrease in the malaria infection rate in the sprayed areas of West Pakistan and the parasite rate has been reduced thus far to approximately 300 cases per million population.

In 1963 a house-to-house search for malaria victims in the district of Sheikhupura revealed but 235 cases out of a total of 1.1 million people and most of these cases were identified as imported cases from the surrounding districts.

The Malaria Eradication Program will be extended to 17.2 million people in West Pakistan by October 1964. A thorough geographic reconnaissance has been completed in the present operational areas, and is being conducted in all new areas. This includes mapping and numbering of ^{all} 211 houses and a detailed census of every community and household.

East Pakistan

The total population protected by the Malaria Eradication Program in East Pakistan is 5.7 million in the districts of Dinajpur and Rangpur. The total number of houses sprayed in 1963 was 1,271,728 with coverage of approximately 98 per cent in the districts of Dinajpur and Rangpur. Prior to spraying operations, the malaria infection rate in these districts varied from 5 to 50 per cent. The progress of the program in East Pakistan has been very satisfactory and the parasite rate has been reduced thus far to approximately 200 cases per million population. In 1963 active house-to-house surveillance disclosed only 213 cases in the Dinajpur district out of 1.7 million population. The current year's malaria program will protect a total population of 9.8 million people. Thorough geographic reconnaissance is being conducted in all operational areas.

17.2	9.1	5.7	14.8
	17.2	9.8	27.0

Training of Personnel

Two major training centers are operated by the Pakistan Malaria Eradication Program at Dacca and Lahore. These centers are conducting courses for senior and junior malaria officers, laboratory technicians, health educators, and other key personnel. The courses are prepared in accordance with international standards with the assistance of WHO and USAID advisors. Training is scheduled in close correlation with field requirements as the program expands. Through 1963 training was given to 72 senior and 1,518 junior officials, and over 5,000 field workers were trained locally.

Advisory Services

In order to strengthen the planning administrative and logistical capabilities of the agencies which have the responsibility for carrying out the planned fourteen years Malaria Eradication Program, USAID/Pakistan has established positions to provide two senior malaria advisors, two provincial malaria advisors, and two specialists in supply and procurement and equipment maintenance and operation. WHO has established 13 positions for additional required advisory services in administrative and technical specialties.

Impact on the Population

The program has been well received by the population. A health education and public relations program is conducted in all operational areas. The operations extend to every household in the rural areas. The Malaria Eradication Program has accomplished a significant and well-recognized reduction of malaria in the sprayed areas. This has incontestably resulted in relieving the people of a major cause of debilitation, incapacity to work, and inefficiency, as well as direct costs of medical treatment. The Malaria Eradication Program is clearly making an important contribution to the human resources necessary to social and economic development.

Direct economic effects are strongly suggested by an investigation made in the district of Sheikhpura in West Pakistan showing a considerable increase in rice production in areas in the Malaria Eradication Program, as compared with adjacent uncontrolled malarious areas with similar local conditions.

Summary

Progress in Malaria Eradication Program (Population Reached)^{1/}

<u>Year</u>	<u>East Pakistan</u>	<u>West Pakistan</u>	<u>Total</u>
1960-61 ^{2/}	—	1,048,000	1,048,000
1961-62	1,753,000	2,617,000	4,370,000
1962-63	5,785,000	7,535,000	13,320,000
<hr/>			
1963-64 ^{3/}	10,757,000	15,284,000	26,041,000
1964-65	17,761,000	24,465,000	42,226,000
1965-66	21,906,000	30,275,000	52,181,000

1/ Population in areas covered by geographic reconnaissance and spraying operations.

2/ Completed figures for 1960-63.

3/ Projected figures for 1963-66.

III. Borrower

The Borrower will be the President of Pakistan. The recipient of the loan and agent for implementation of the program will be the Central Malaria Eradication Board. The Malaria Eradication Board was established and its powers enumerated in an ordinance signed by the President of Pakistan on June 1, 1961.

The Board has the following representatives:

Minister for Health, Government of Pakistan (Chairman);

Secretary to the Ministry of Finance, Government of Pakistan;

Director General of Health, Government of Pakistan;

Director General, Medical Services of the Armed Forces, Government of Pakistan;

Director, Health Services, East Pakistan;

Director, Health Services, West Pakistan;

Director, Bureau of National Reconstruction, Government of Pakistan;

Director, Malaria Eradication Program, Government of Pakistan
(Secretary); *M. S. Khan*

One expert on Malaria Eradication (Appointed by the Government of Pakistan). *M. S. Khan*

The Board has complete financial autonomy and receives contributions from Provincial and Central Governments and aid-giving agencies into the Malaria Eradication Fund. The personnel responsible for implementing the scheme are employees of the Board and are governed by rules and regulations established by this body. The Board has delegated executive responsibilities to the Director of the Malaria Eradication Program. Two provincial chiefs have been appointed who are under the administrative control of the Director and are responsible for executing the scheme in the two provinces. Direct chain of command exists from the Director to the lowest echelon without intervention of Provincial Government or other administrative authorities.

IV. Economic Analysis

It has been proven that the prevalence of malaria has a profound effect in retarding the development of agriculture and other general economic development projects of the country. The justification for selection of this activity for recommended loan financing should, therefore, be considered not only from the point of view of its effect on health conditions of the people, but also from its impact on the developmental effort, particularly in the agricultural sector. Already in districts which have been protected against malaria, such as Sheikhpura and Sialkot in West Pakistan, the agricultural production trend suggests that as compared to the unprotected districts, the agricultural yields are increasing. The results of an experiment conducted in East Pakistan by WHO (1949-51) suggests that removal of malaria alone may result in 15 per cent to 40 per cent increase in agricultural production. Additionally, it has been estimated that 20,000,000 people in Pakistan are affected annually, being incapacitated for an average of six working days and continuing below full productive capacity for approximately two more months. Quite apart from the losses in production, malaria also reduces initiative, imagination, interest in learning and energy, all of which are required for maximum progress in development. World-wide experience has conclusively demonstrated that economic development cannot be achieved in malarious areas without first eliminating the disease as an economic and social depressant.

FINANCIAL ANALYSIS

A. ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1964-65 .
PAKISTAN MALARIA ERADICATION PROGRAM

	1964 - 65			TOTAL
	Quantity and Price	East Pakistan	West Pakistan	
D.D.T. ^{1/}	2575 @ 551	1,418,825)	
	2965 @ 551		1,633,715)	3,052,540
		<u>1,418,825</u>	<u>1,633,715</u>	<u>3,052,540</u> ✓
SPRAY EQUIPMENT				
Sprayers	4495 @ 36.43	163,753)	
	4704 @ 36.43		171,367)	335,120
Spare Parts Sets	717 @ 29.66	21,266)	
	1004 @ 29.66		29,779)	51,045
Nozzle Tips	34,460 @ 0.80	27,568)	
	72,288 @ 0.80		57,830)	85,398
		<u>212,587</u>	<u>258,976</u>	<u>471,563</u>
TRANSPORT				
Pickups	45 @ 2216	99,720)	
	85 @ 2216		188,360)	288,080
Jeeps CJ-6	10 @ 2008	20,080)	20,080
Spare Parts		69,212	191,103	260,315
Workshop Tools			31,360	31,360
Workshop Sheds	2 @ 14,000	28,000)	
	2 @ 15,000		30,000)	58,000
		<u>217,012</u>	<u>440,823</u>	<u>657,835</u>

LT. 4,181,938

^{1/} Quantity in Metric Tons

ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1964-65
PAKISTAN MALARIA ERADICATION PROGRAM

	Quantity and Price	1964 - 65		TOTAL
		East Pakistan	West Pakistan	
LAB. EQUIPMENT				
Microscopes (oil)	104 @ 417.50	43,420)	
	128 @ 417.50		53,440)	96,860
Microscopes (Dissecting)	4 @ 100		400	400
Microscopes (Stereo)	12 @ 416.67		5,000	5,000
Chemicals and Other		14,720	10,440	25,160
		<u>58,140</u>	<u>69,280</u>	<u>127,420</u>
Sub-Total		1,906,564	2,402,794	4,309,358
Add 1% for East Pakistan ^{2/}		19,065	-	19,065
		<u>1,925,629</u>	<u>2,402,794</u>	<u>4,328,423</u>
Freight estimated @ 12%		<u>231,075</u>	<u>288,335</u>	<u>519,410</u>
GRAND TOTAL		<u>2,156,704</u>	<u>2,691,129</u>	<u>4,847,833</u>

^{2/} Additional shipping cost for East Pakistan

B. ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1965-66
PAKISTAN MALARIA ERADICATION PROGRAM

	1965 - 66			TOTAL
	Quantity and Price	East Pakistan	West Pakistan	
D.D.T. ^{1/}	2712 @ 551	1,494,312)	
	3640 @ 551		2,005,640)	3,449,952
		<u>1,494,312</u>	<u>2,005,640</u>	<u>3,449,952</u>
SPRAY EQUIPMENT				
Sprayers	2280 @ 36.43	83,060)	
	3456 @ 36.43		125,902)	208,962
Spare Parts Sets	752 @ 29.66	22,304)	
	1192 @ 29.66		35,355)	57,659
Nozzle Tips	36,160 @ 0.80	28,928)	
	85,824 @ 0.80		68,659)	97,587
		<u>134,292</u>	<u>229,916</u>	<u>364,208</u>
TRANSPORT				
Pickups	22 @ 2216	48,752)	
	72 @ 2216		159,552)	208,304
Jeeps CJ-6	19 @ 2008	38,152		38,152
CJ-5	43 @ 1873		80,539	80,539
Boats	9 @ 600	5,400		5,400
Spare Parts		85,072	238,779	323,851
Workshop Tools		<u>7,400</u>	<u>23,040</u>	<u>30,440</u>
		<u>184,776</u>	<u>501,910</u>	<u>686,686</u>

^{1/} Quantity in Metric Tons

ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1965-66
PAKISTAN MALARIA ERADICATION PROGRAM

	1965 - 66			TOTAL
	Quantity and Price	East Pakistan	West Pakistan	
LAB. EQUIPMENT				
Microscopes (Oil)	59 @ 417.50	24,633)	
	93 @ 417.50		38,827)	63,460
Microscopes (Dissecting)	4 @ 100	400		400
Chemicals and Other		15,620	9,973	25,593
		<u>40,653</u>	<u>48,800</u>	<u>89,453</u>
Sub-Total		1,854,033	2,786,266	4,640,299
Add 1% for East Pakistan <u>2/</u>		18,540		18,540
		<u>1,872,573</u>	<u>2,786,266</u>	<u>4,658,839</u>
Freight estimated @ 12%		<u>224,709</u>	<u>334,352</u>	<u>559,061</u>
GRAND TOTAL		<u>2,097,282</u>	<u>3,120,618</u>	<u>5,217,900</u>

2/ Additional shipping cost for East Pakistan

C. ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1964-65 and 1965-66
PAKISTAN MALARIA ERADICATION PROGRAM

	Quantity and Price	1964-65 and 1965-66		TOTAL
		East Pakistan	West Pakistan	
D.D.T. ^{1/}	5284 @ 551	2,913,137)	
	6605 @ 551		3,639,355)	6,552,492
		<u>2,913,137</u>	<u>3,639,355</u>	<u>6,552,492</u>
SPRAY EQUIPMENT				
Sprayers	6775 @ 36.43	246,813)	
	8160 @ 36.43		297,269)	544,082
Spare Parts Sets	1469 @ 29.66	43,570)	
	2196 @ 29.66		65,134)	108,704
Nozzle Tips	70,620 @ 0.80	56,496)	
	158,112 @ 0.80		126,489)	182,985
		<u>346,879</u>	<u>488,892</u>	<u>835,771</u>
TRANSPORT				
Pickups	67 @ 2216	148,472)	
	157 @ 2216		347,912)	496,384
Jeeps CJ-6	29 @ 2008	58,232		58,232
CJ-5	43 @ 1873		80,539	80,539
Boats	9 @ 600	5,400		5,400
Spare Parts		154,284	429,882	584,166
Workshop Tools		7,400	54,400	61,800
Workshop Sheds	2 @ 14,000	28,000)	
	2 @ 15,000		30,000)	58,000
		<u>401,788</u>	<u>942,733</u>	<u>1,344,521</u>

^{1/} Quantity in Metric Tons

ESTIMATED FOREIGN EXCHANGE COSTS OF THE 1964-65 and 1965-66
PAKISTAN MALARIA ERADICATION PROGRAM

	1964-65 and 1965-66			TOTAL
	Quantity and Price	East Pakistan	West Pakistan	
LAB. EQUIPMENT				
Microscopes (Oil)	163 @ 417.50 221 @ 417.50	68,053)) 92,267)	160,320
Microscopes (Dissecting)	4 @ 100	400	400	800
Microscopes (Stereo)	12 @ 416.67		5,000	5,000
Chemicals and Other		<u>30,340</u> <u>98,793</u>	<u>20,413</u> <u>118,080</u>	<u>50,753</u> <u>216,873</u>
Sub-Total		3,760,597	5,189,060	8,949,657
Add 1% for East Pakistan ^{2/}		<u>37,605</u>	<u>5,189,060</u>	<u>37,605</u> <u>8,987,262</u>
Freight estimated @ 12%		<u>455,784</u>	<u>622,687</u>	<u>1,078,471</u>
GRAND TOTAL		<u><u>4,253,986</u></u>	<u><u>5,811,747</u></u>	<u><u>10,065,733</u></u>

^{2/} Additional shipping cost for East Pakistan.

D. Estimated Cost of the 14 Year Malaria Eradication Program

The total cost of the fourteen (14) year Malaria Eradication Program will be \$137.8 million equivalent. The local currency component is \$101.8 million equivalent and the foreign exchange component is \$36.0 million. The estimated costs of the phase of the program for 1964-65 is \$13.5 million, consisting of \$5.1 in foreign exchange and \$8.4 million in local currency. The estimated cost of the phase of the program for 1965-66 is \$15,842,504 million, consisting of \$5,217,500 in foreign exchange and \$10,624,604 million in local currency.

The A.I.D. loan of \$10.4 million should be fully expended by January 1967, if the program proceeds according to plan.

The detailed estimated breakdown of the foreign exchange cost to be incurred in 1964-65 and 1965-66 and for the 14 year Program is attached as Annex I, Exhibit A.

In the course of discussions with the Malaria Eradication Board, it was determined that a recosting of the entire program had taken place since USAID/Pakistan submitted both the Loan Application and the Intensive Review Request (IRR). This recosting is reflected in Annex I, Exhibit B. It will be noted that the local currency costs have increased from \$68.5 to 101.8 million, and the foreign exchange costs have decreased from \$40.8 to \$36.0 million, compared to the estimates given in the original loan application and reflected in AID Loan Paper No. AID-DLC/P-90. This is due largely to the transfer of some commodities from foreign to local currency funding (DDT); the inclusion of customs duties and sales taxes on foreign supplies in the local currency budgets; and the increase in salaries in accordance with the national revision of pay scales.

After comprehensively reviewing all of the items requested in the foreign exchange requirements of the loan application and comparing them with the recosted figures (Annex I, Exhibit B), it was found that the application was \$241,420 in excess of the actual loan requirements for 1964-65.

The Malaria Eradication Board requests this additional amount be authorized to cover the possibility of increased costs of equipment and commodities to be imported from the United States. USAID/Pakistan concurs in the request that \$241,420 be included as a contingency item in the list of required material.

The Government of Pakistan has requested this loan of 10.4 million dollars to cover imported commodities and equipment for a two-year period (1964-66) in order to permit more efficient planning and insure on-time delivery. This is considered necessary because of procurement lead time, the distance from source of procurement, the peculiar geographical distribution of the receiving ports and the uncertainty of shipping facilities including such emergencies as off-loading and shipment suspensions. Also, the procurement services of the Government of Pakistan which purchase all items except DDT and sprayers tend to function at a slower pace than U.S. agencies. For these reasons, USAID agrees with the reasons set forth above and endorses the concept of a loan for a two-year period.

E. Interest of Other Lending Institutions

No other foreign lending institutions are participating in financing material for the Program. However, WHO is paying the expenses of 13 technicians whose annual costs are estimated at \$250,000.

F. Disbursements Under Loan 391-H-053

The total amount disbursed under Loan 391-H-053 is shown as follows:

<u>Letter of Commitment</u>	<u>Date</u>	<u>Cumulative Payments</u>
053-1 (1,572,140)	7/31/63	\$183,679.89
	9/30/63	421,590.04
	12/31/63	757,113.37
	1/31/64	790,209.68
<u>PA/PR No.</u>	<u>Date</u>	<u>Cumulative Payments</u>
3206 (1,680,000)	11/30/63	\$82,859.18
	1/31/64	82,859.18
3207 (391,060)	10/31/63	35,475.63
		35,475.63

A balance of \$156,800 remains to be committed before June 30, 1964. Firm orders for this amount are being placed and disbursements are proceeding satisfactorily under Loan 391-H-053.

VI. Repayment Prospects

The payments of the principal and the credit fee are the responsibility of the Central Government and there are reasonable prospects that the loan will be repaid at reasonable interest.

VII. Impact on U.S. Economy

The proposed loan will have a favorable impact on the U.S. economy since all procurement thereunder will be from the United States and there will be no appreciable other effect on U.S. imports and exports.

VIII. Identification of Issues, Problems, etc.

The total local currency cost of this program is estimated to be 458 million rupees, if carried out according to the present plan. Until this fiscal year, the GOP has appropriated sufficient funds to cover the local costs of the program and the foreign exchange costs of the program have been provided under A.I.D. loans. In FY 1963-64, however, the West Pakistan malaria appropriation was not sufficient to cover the costs of the program. A total of 14.7 million rupees (equivalent \$3.1 million) were requested, but only 7 million rupees (equivalent \$1.5 million) were appropriated. This fund deficiency has had the following results:

(a) 800 tons of locally produced DDT were delivered to program and partially utilized, but there are no funds for payment.

Since the DDT was produced by a plant owned by the Ministry of Health, lack of payment is not as yet affecting deliveries.

(b) Several hundreds of thousands of dollars worth of additional supplies and equipment have arrived in Karachi and arrangements have been made to defer payment of customs duties and taxes until a later date.

If the GOP does not provide the amount of local currency called for in the present plan of operations, or provide exemption from custom duties and taxes, it would be necessary to revise the plan. Such revisions would be costly and prolong the program. Additionally, any revision in the GOP's present plan would be inconsistent with her international commitments to WHO, USAID, and neighboring countries.

This loan paper contains charts that clearly spell out the funds that will be needed for the remaining twelve years of operation of the program. The GOP has recently given assurance that the program as outlined for completion in 14 years is accepted in principle and that the necessary funds towards this end are being provided in the Third Plan. The Malaria Eradication Board has recently indicated that the arrangements for deferred payment of obligations mentioned on the preceding page will assure adequate available funding through the year completing the Second Plan. It is apparent, therefore, that the GOP recognizes the problems involved and there are reasonable prospects that sufficient local currency will be allocated to this program to assure its successful conclusion.

FOREIGN EXCHANGE COMPONENT FOR THE TOTAL PROGRAM
(in dollars)

	<u>Original Estimate</u>	<u>Recosted</u>	<u>Difference</u>
DDT	\$26,922,195	\$22,751,515	-\$4,170,680
Spray Equipment	1,715,919	2,559,515	+ 843,596
Transport	6,244,181	5,989,760	- 254,421
Lab Equipment	1,497,774	888,153	- 609,621
Malaria Drugs	698,780	-	- 698,780
Freight	3,707,885	3,821,841	+ 113,956
	<hr/>	<hr/>	<hr/>
TOTAL	\$40,786,734	\$36,010,784	-\$4,775,950
	<hr/>	<hr/>	<hr/>

11.7% decrease

LOCAL CURRENCY COMPONENT
(in dollars)

Personnel	\$53,003,174	\$65,042,568	+\$12,039,394
Sales Tax	-0-	6,117,274	+ 6,117,274
Customs Duty	-0-	6,732,269	+ 6,732,269
Local Purchases	2,266,194	10,136,222	+ 7,870,028
Local Expenses	13,071,046	13,801,028	+ 729,982
	<hr/>	<hr/>	<hr/>
TOTAL	\$68,340,414	\$101,829,361	+\$33,488,947
	<hr/>	<hr/>	<hr/>

49% increase

GRAND TOTAL	<u>\$109,127,148</u>	<u>\$137,840,145</u>	<u>+\$28,712,997</u>
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26.3% increase

NOTE: Dollar amounts converted from rupees (Rs. 4.80 = \$1.00)

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PAKISTAN MALARIA ERADICATION PROGRAM BREAKDOWN OF EXPENDITURES 1960-75
(in dollars)

	<u>1960-61</u>	<u>1961-62</u>	<u>1962-63</u>	<u>1963-64</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>	<u>1967-68</u>
D.D.T.	28,316	368,603	892,620	1,225,187	3,066,728	3,514,895	4,063,223	3,727,025
Spraying Equip.	4,459	54,177	136,586	325,096	472,689	365,551	445,297	368,261
Transport	10,184	297,138	515,868	535,009	660,005	688,534	867,660	555,716
Lab. Equip.	3,146	45,025	51,194	155,836	128,001	89,860	109,693	99,738
SUB-TOTAL	<u>46,105</u>	<u>764,943</u>	<u>1,596,268</u>	<u>2,241,128</u>	<u>4,328,423</u>	<u>4,658,840</u>	<u>5,485,873</u>	<u>4,750,740</u>
Freight	4,610	76,497	176,424	224,112	519,410	559,060	658,304	570,090
GRAND TOTAL	<u>50,715</u>	<u>841,440</u>	<u>1,772,692</u>	<u>2,465,240</u>	<u>4,847,833</u>	<u>5,217,900</u>	<u>6,144,175</u>	<u>5,320,830</u>

PAKISTAN MALARIA ERADICATION PROGRAM BREAKDOWN OF EXPENDITURES 1960-75
(in dollars)

	<u>1968-69</u>	<u>1969-70</u>	<u>1970-71</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>TOTAL</u>
D.D.T.	3,022,791	1,773,041	697,864	393,052	-	-	-	22,773,345
Spraying Equip.	242,010	125,476	25,247	6,762	-	-	-	2,572,611
Transport	513,264	423,738	334,540	248,530	165,918	97,774	67,121	5,980,999
Lab. Equip.	65,030	42,677	29,464	25,741	20,711	17,726	9,716	393,558
SUB-TOTAL	<u>3,843,095</u>	<u>2,364,932</u>	<u>1,087,115</u>	<u>674,085</u>	<u>186,629</u>	<u>115,500</u>	<u>76,837</u>	<u>32,220,513</u>
Freight	461,171	283,792	130,454	80,871	22,395	13,860	9,221	3,790,271
GRAND TOTAL	<u>4,304,266</u>	<u>2,648,724</u>	<u>1,217,569</u>	<u>754,956</u>	<u>209,024</u>	<u>129,360</u>	<u>86,058</u>	<u>36,010,784</u>

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IMPLEMENTATION PLAN

A. TOPOGRAPHY

Pakistan has an area of 364,737 square miles, having two wings separated by 1,200 miles of Indian territory. It has a population of 94 million in 1961 (1951 census) — 51 million in East Pakistan and 43 million in West Pakistan.

1. EAST PAKISTAN

East Pakistan, 55,134 square miles in area, lies between 20° and 27° N latitude and 92° to 93° E longitude. The climate is humid with temperature ranging from 50° F in winter// Rainfall varies from 75" to 150". The southern part of the Central East Pakistan consists of the deltaic region formed by the rivers flowing into the Bay of Bengal. The South Eastern area consists of hilly tracts and the rest of the area is plain. East Pakistan is subject to recurring and extensive floods in the rainy season (May - September). The Central and coastal regions are then submerged except for limited highland areas.

In the Eastern Province malaria is prevalent in the dry, elevated territories, and is of minor importance in the low-lying, flooded districts. The epidemiological picture shows therefore marked differences, the disease is hyper or mesoendemic in the North West, is basically hypoendemic in the major central part of the Province, and again reaches a high incidence in the South East. Limited foci can be found on the borders with West Bengal, a narrow strip of hyper and mesoendemicity follows strictly the Assamese foothills in the north of Mymensingh District. Therefore, because of the spotted distribution of the disease, an overall figure for Spleen and Parasite Rate would not give a true picture of the endemicity.

Malaria can be classified as unstable in most parts of the province, where A. philippinensis and A. sundaicus are the main vectors, it reaches a condition of stability in the hilly areas where A. minimus is responsible for transmission.

Malaria is not a notifiable disease, the diagnosis is established on clinical grounds only, and therefore the morbidity data available are not very reliable. Moreover, transmission occurs in seasonal coincidence with other febrile disease.

The same applies to the mortality data (41,000 deaths in 1958).

The three main species of plasmodia, P. vivax, P. falciparum and P. malariae are found in East Pakistan. Mixed infections are frequent in the A. minimus area.

The main transmission season is from April to November, but climatic conditions allow the transmission to continue at a lower level, all the year round (mean temperature never below 60° F. Relative humidity never below 60%). The monsoon rains have considerable importance in building up a reservoir for the monsoon transmission season. The peak of transmission occurs in October-November.

// to 100° F in summer.

Forty-five Anopheline species are present in East Pakistan. Of these A. philippinensis is considered as the main vector in the plains, A. sundaicus in the deltaic region, and A. minimus in the hills. The part taken by suspected secondary vectors (A. culicifacies, A. aconitus and others) in transmitting the disease has still to be investigated.

2. WEST PAKISTAN

West Pakistan has an area of 309,239 square miles which lies between 22.5° and 37° N latitude and 61.5° to 75.5° E longitude. The extreme North Western part of the province is hilly and is on an average about 3,000 ft. above sea level. The climate shows a great deal of variation in the different parts of the province. The night temperature sometimes reaches the freezing points in winter months (December - February) while during the day it does not rise above 80° F. In the summer months (May - September), on the other hand, temperature rises high, even over 130° F in some areas. The annual rainfall ranges from 5" to 50" in different areas. The main rivers flowing through West Pakistan are Indus, Jhelum, Chenab, Ravi and Sutluj. The province is usually prone to floods during the rainy season (July - September).

Malaria is endemic in the rural areas of West Pakistan and is a major health problem, affecting especially the plains.

The degree of endemicity in different regions of West Pakistan varies considerably. The central districts of former Punjab and some districts of former Sind are highly malarious and hyperendemic, spleen rate reaches 80-90% in certain districts, while in the remaining malaria is moderately endemic (10-50%). Small areas in the desert tracts of Baluchistan and in the high mountainous areas of the North West Frontier area are of very low endemicity. The population at risk is estimated at 35 millions.

Malaria in West Pakistan can be classified as unstable. The great fluctuation in the incidence, the periodic epidemics, the predominance of the Plasmodium vivax and the presence of A. culicifacies and A. stephensi are the factors justifying this classification.

Malaria is not a notifiable disease. Diagnosis of malaria cases in rural dispensaries is often inaccurate. From available figures it may be stated that during 1930-55, an average of 4-5 million malaria cases received treatment each year at the Government hospitals and dispensaries. This represents only 20% of all the cases referred for treatment — most of the cases are not diagnosed in hospitals.

Three species P. vivax, P. falciparum and P. malariae are encountered in West Pakistan.

There is a definite correlation between malaria and rainfall. In the years of abnormal rainfall when flood occurs in rivers and water channels causing water-logging, the incidence of malaria becomes high in the months of September, October and November. The incidence of the disease then gradually declines during the months of January, February and March with slight rise in the months

of April and May. There are two peaks of malaria transmission, one in the months of July and August, and the other in the months of November and December.

Out of 17 anopheline species found in West Pakistan, A. culicifacies, A. superpictus, A. stephensi and A. fluviatilis are the suspected vectors. A. culicifacies and A. stephensi are found all over West Pakistan, while A. superpictus is encountered in Quetta Region, and A. fluviatilis in some foothill areas of the Punjab and Frontier Regions.

A. culicifacies may breed in any type of clear water collections while A. stephensi is a clear water breeder. A. superpictus and A. fluviatilis are breeders in clear running waters. They are found resting abundantly in human habitations and cattle sheds, etc.

The sporozoite rates of 0.9 - 22.4% for A. culicifacies and 0.2% (Baluchistan) to 9.3% in Punjab for A. stephensi have been reported. No infection has been yet found in A. fluviatilis in West Pakistan. An infection rate of 4.9 has been found for A. superpictus in Quetta.

B. OBJECTIVES

The Government has the following objectives in connection with the Plan:

1. Long-term objectives.

To eradicate malaria from the entire country and to prevent its reintroduction.

2. Short-term objectives.

- (a) To delimit the malarious areas by a complete geographical and epidemiological reconnaissance of the country.
- (b) To determine the areas of operations in which the program will be implemented by successive stages.
- (c) To interrupt malaria transmission by intradomestic application of residual insecticides or by any other methods which may be necessary and appropriate.
- (d) To establish a suitable mechanism of epidemiological evaluations and surveillance to prove the efficiency of the work carried out and to demonstrate the interruption of malaria transmission.
- (e) To maintain active and passive surveillance activities throughout the consolidation phase of three years duration and to eliminate completely any residual foci of malaria transmission or any residual parasitaemia.

1. Minister for Health Chairman
2. Secretary, Ministry of Finance (Expenditure)
3. Director General Armed Forces Medical Services
4. Director General of Health
5. Director of Health Services, East Pakistan
6. Director of Health Services, West Pakistan
7. Col. M.K. Afridi
8. Director, Bureau of National Reconstruction
9. Director, Malaria Eradication Program Secretary

The Director of the Program will implement the Boards program and directives and shall be advised by WHO experts. As Secretary of the Board, he will prepare agenda, reports, financial statements, future plans of action, staff proposals, progress reports and any other specific matter which may be discussed at the meetings of the Board from time to time. He will have effective control of malaria eradication funds and personnel.

In the Provinces of East and West Pakistan the Director will be represented by a Provincial Chief of Malaria Eradication assisted by a Provincial Board consisting of the following:

1. Director of Health Services of the Province ... Chairman
2. Provincial Chief of Malaria Eradication
3. Representative of Finance Department of the Province
4. Representative of Home Department of the Province
5. One expert nominated by the Central Board

The functions and duties of the Provincial Board will be:

1. To review and approve the final plans of action for each zone's operations before it is submitted for sanction to the Malaria Eradication Board.
2. To review during its regular sessions the progress of the program reported by the Provincial Chief of Malaria Eradication.
3. To execute measures adopted by the Central Board.

The Provincial Health staff will not be in charge of the executive operation of the Scheme, but they will be kept informed of the progress of the eradication program. They will remain responsible for distribution of anti-malaria drugs in endemic malarious areas or in epidemic out-breaks pending the inclusion of such areas in the eradication program. Except in a few strategic points, all spraying operations in the country not included in the eradication program from year to year will be suspended.

The existing malaria staff of the Provinces will be absorbed as needed in the Malaria Eradication Service.

E. PLAN OF ACTION

1. Scope of the Project

The Government intends to develop with the technical advice of WHO and the assistance of other international agencies an overall project for the eradication of malaria in Pakistan. This project will be implemented by successive stages and is expected to last from 1961-1974. The population to be protected, which according to 1961 census is 51 millions in East Pakistan and 43 millions in West Pakistan, is expected to increase at the rate of 1.8% in West Pakistan and 2% in East Pakistan.

2. Financing

It is estimated that the cost of the malaria eradication campaign in East and West Pakistan will reach a total of approximately Rs. 66 crore (or U.S. \$137,840,145).

Out of this total, \$101,820,361 represents the local expenditure salaries of national personnel, supplies to be bought locally, transport, maintenance and miscellaneous expenses.

The balance of \$36,010,784 represents the cost of imported supplies and in this connection the Government will require assistance from other International Agencies.

The entire resources of the Provincial Governments and the Central Government will be pooled together in the form of a Fund to be administered by the Board. It will, however, be ensured that the Provincial contribution is utilized in its own malaria program. The international aid will also be credited to this Fund.

3. Organization of the National Malaria Eradication Service

As mentioned above, Malaria Eradication personnel will be employees of an autonomous body under a National Director. Population will be divided into Regions and into Zones. The Zones themselves are divided into sectors and sub-sectors. The subsector is the elementary field unit and represents the area covered by a spraying squad or a surveillance agent and includes an average of 12,500 inhabitants in West Pakistan and 10,000 inhabitants in East Pakistan. With the exception of the regions for which the main point of consideration was the concentration of population, the distribution into Zones and Sectors was usually made following the administrative division into districts and thanas, but according to the number of population, one district may be divided into two Zones or several grouped together in one Zone.

There will be altogether 3 Regions and 31 Zones in East Pakistan and 4 Regions and 35 Zones in West Pakistan. The number of population per zone ranges from 0.3 to 2 million in East Pakistan and from 0.6 to 1.5 million in West Pakistan.

- (f) To organize an efficient system of public relations and of health education to ensure the full understanding and cooperation of the whole population from the onset of the program until malaria is eradicated.
- (g) To train the National Personnel of all categories, technical, administrative and auxiliary, engaged in the accomplishment of the program.
- (h) To promote the necessary regulations in order to prevent the reintroduction of malaria in the areas freed from malaria.

C. METHODS

To develop activities according to the technical methods and procedures recommended by WHO and its experts Committee on Malaria in pursuant of the policy of the World Health Assembly. These methods are mainly:

1. Spraying the interior of human dwelling and any other structure as may be deemed necessary with residual insecticides.
2. Establishing a system of evaluation and surveillance to assess progress of the campaign, to demonstrate interruption of malaria transmission, to detect and treat malaria cases and to eliminate any residual foci of transmission or the remaining malaria parasite carriers by appropriate measures.
3. Ensuring the cooperation of public during the different phases of the campaign by an efficient system of Public Relations and Public Health Education.

D. ADMINISTRATION AND ASSIGNMENT OF RESPONSIBILITIES

100 This project will be conducted under the responsibility of the Government with the technical advice of WHO and the material assistance from other international agencies.

The overall policy of malaria eradication and the execution of the entire program will rest with an Autonomous Malaria Eradication Service under a Director who will be responsible to Malaria Eradication Board.

The Malaria Eradication Board has been constituted by an Ordinance promulgated on 1st June, 1961.

This Board is vested with the overall responsibility for determining, within the framework of this Plan of Operations, all policies, programs and directives.

The Board consists of:

Functions and responsibilities are distributed accordingly at each level from the National Headquarters to the Zones, namely:

A section of Epidemiological evaluation responsible for all epidemiological and entomological investigations, including laboratory activities and for surveillance operations as well as for consolidation of statistical data.

A section of field operations responsible for geographical reconnaissance, spraying operations and vehicle maintenance and repairs.

A section of Health Education.

A section of administration responsible for personnel management, financial control and accounting supply services and warehousing.

4. The Phasing of the Program

The Malaria Eradication in East Pakistan and West Pakistan will be implemented by successive stages and is scheduled to last a minimum of 13 years from 1960-61 to 1973-74.

Each zone will represent an independent operational unit. The program will include four successive phases:

- preparatory phase
- attack phase
- consolidation phase
- maintenance phase

The program has been divided in such a way that no zone will enter into the consolidation phase until the contiguous zones are at least in the second year of the attack phase. It will be noted that the spraying operations are scheduled to last four years in West Pakistan and only three years in East Pakistan except in areas where the main vector is A. minimus, where four years of spraying will be implemented.

In East Pakistan, in the areas where recent investigations showed that malaria endemicity is very low, it is suggested that during the preparatory phase, which should be extended to a minimum of one year, conventional malarimetric surveys be supplemented by "fever cases surveys" on a total coverage basis. Entomological investigations will be made concurrently to assess the presence, the seasonal density and the bionomics of the vector species.

Should these investigations fail to demonstrate the existence of any malaria, it may be decided to exclude such areas from the spraying operations and to rely on total coverage by surveillance activities to be maintained for the three years of normal duration of the consolidation phase. No decision, however, will be taken unless it is proved that no malaria transmission, even at a very low level, can be detected.

It is noted that in areas of very low endemicity immunity against malaria is more or less lacking among the population and these areas are liable to serve malaria outbreaks or epidemics when climatic conditions become particularly favorable to the breeding of the vector species.

5. Plan of Work

Activities in this Plan of Work are planned in accordance with the fiscal year.

(a) Preparatory Phase

This phase will start in the month of July of the first year on which each zone is going to be included in the program and will last until the beginning of the spraying operations. It will include:

- i) The geographical reconnaissance of the area with the numbering of all houses or structures to be sprayed, the census of inhabitants per house, the sprayable surface per capita, the fixing of house cards and the establishment of sketch maps of the villages.
- ii) An epidemiological preoperational survey to complete the existing data on malaria prevalence, to confirm the season of transmission, the distribution of anopheline species with special reference to the vector species and its susceptibility to insecticides and to collect baseline data which will be used later on to assess the results of the campaign.
- iii) The initiation of Health Education activities to explain to the people the scope and aim of malaria eradication and the benefits to be expected, in order to ensure their cooperation.

At the end of the preparatory phase a Plan of Action will be worked out of each giving all the details of the implementation of the program. This plan will be endorsed by the Regional Chief of Malaria Eradication, submitted for review to the Provincial Chief of Malaria Eradication and to the Provincial Board for approval to the Director of the Program and eventually to the Malaria Eradication Board.

(b) Attack Phase

i) Total coverage spraying operations

The insecticides to be used will be DDT wettable Power 75% or 50% Susceptibility tests carried out in West Pakistan and circumstantial evidence in East Pakistan show that the local vector species are highly susceptible to this insecticide. The advisability of using DDT in the areas of East Pakistan where the vector is A. sundaious will be decided later on prior to their inclusion in the Program.

According to the recommendations of the WHO Malaria Demonstration Team (1951), spraying operation in East Pakistan will be initiated in March with a single spraying cycle and a dosage of 2 grams of DDT per square meter.

In West Pakistan, however, taking into consideration the transmission season, the rainy season and local habits of people in repairing and replastering their houses, it has been decided to cover sprayable surface with DDT at 1 gram per square meter in two successive rounds of spraying, the first round to start in June and the second in August. This procedure has also been recommended by local Malaria Experts and is being followed in neighboring countries with similar epidemiological conditions.

Timing and number of cycles of spraying operations and dosages of insecticides may be modified later on in the light of experience gained.

In West Pakistan, cities with population exceeding 20,000 inhabitants will be excluded from spraying. However, strategic barrier spraying will be applied in the premises located in the outskirts of the cities where there is no mosquito control program in operation.

In East Pakistan no such distinction will be made.

ii) Evaluation and surveillance activities during the attack phase

Evaluation of the work carried out and the results achieved will be done from the first year of the campaign and merge into the full surveillance mechanism during the last year of the spraying operations.

These activities will be carried out under the supervision of the Evaluation of Zone and by the evaluation staff including squad leader. They will include:

(a) Malariometric surveys among children of two to nine years of age in selected representative villages of each zone. These surveys will be conducted twice a year, one of which will be carried out during the transmission season.

(b) Monthly house-to-house visits to detect fever cases and follow up the infant parasite rate. In West Pakistan, this survey will be limited to infants and to 2-9 age group.

(c) Monthly blood film collection from the third year on from all fever cases, on a total coverage basis.

(d) Passive surveillance will be progressively organized with the assistance of the community leaders and voluntary collaborators.

(e) Notification of all suspected malaria cases by medical institutions and private practitioners. Facilities will be provided for the examination of blood films by the Zone laboratories of the Program.

(f) Entomological investigations will be conducted under the technical guidance of the Regional Entomologist to check the response of the different anopheline species and mainly the vector species to insecticides, to corroborate the proper timing of the spraying operations, the optimum dosage of the insecticide to be used and the duration of its effectiveness through routine collections of anophelines for measurement of the vectors' density, susceptibility tests, bioassays or any special studies as deemed necessary.

The main objectives of the epidemiological investigations at the zone level, during Attack Phase, will be to substantiate the complete interruption of malaria transmission and eventually to detect the causes of any shortcomings.

(c) Consolidation Phase

The Consolidation Phase will begin as soon as the spraying operations are discontinued. The discontinuation of the spraying operations will be based on the following criteria:

- Infant parasite rate as nil.
- Number of malaria cases detected during the previous year not exceeding 0.5 per thousand of the population.
- Absence of indigenous malaria cases or their limitation to small and well defined foci.

The Consolidation Phase is scheduled to last three years during which the surveillance mechanism already implemented during the last years of the Attack Phase will be continued. The main objectives during the phase are the systematic detection and treatment of the last residual malaria cases and the complete elimination of any remaining pockets of transmission. Detection of cases will be carried out by all possible means; namely:

- Notification of suspected cases by all Government medical institutions and by private medical practitioners.
- Active and passive surveillance with the assistance of all voluntary collaborators, headmen of the villages, school teachers, religious leaders, Basic Democracy Union members and others.

All suspected cases will be confirmed by a blood film examination and all the facilities will be provided for blood film taking and processing.

Blood films will be examined within the shortest possible time so that proper treatment may be given to patients without delay.

When a positive case is found, the source of infection should be carefully investigated to trace its origin. Cases will be classified as indigenous, imported, relapses, induced or introduced.

Particular attention will be given to the appearance of a secondary case and to local persistence of malaria transmission.

During the Consolidation Phase the objective of the entomological investigations will be:

- To check the reappearance of the vectors in unusual densities in larval or adult stage and to investigate any possible change in their behavior. To carry on the investigations initiated during the Attack Phase on the susceptibility of the vector species to insecticides.
- If any residual or active foci are discovered to study the causes of the persistence or resumption of malaria transmission with special reference to the possible role of secondary vectors.

(d) Maintenance Phase

The Maintenance Phase will begin when no indigenous cases have been discovered by total surveillance coverage for three consecutive years in the last two of which no spraying operations were carried out. In this period, which is supposed to last until malaria is eradicated from the whole world, the responsibility of case detection will be handed over to the general Health Services of the country. Malaria should be a notifiable disease and intercountry or international regulations should be promoted to prevent its reintroduction.

Beginning with the Maintenance Phase, Malaria Eradication Service will be integrated in the general Health Service of the country. It is recommended that the entire staff who have gained considerable technical and social experience be used in other public health activities of the Government.

6. Supply and Transport System

A supply section will be established in Chittagong and Chalna in East Pakistan and in Karachi in West Pakistan for the receiving customs clearance, warehousing and despatching of all imported supplies and equipment to various field stations. Central warehouses will be instituted in the Provinces, Regions and Zones from which supplies will be forwarded to the field according to a carefully established time table. There will be a local store in each sector where necessary supplies should be available at least one month before the beginning of the spraying campaign.

Locally purchased items will be bought mostly at the Provincial or Regional level, inventoried, stock piled in the Central warehouses, and distributed likewise.

Railway facilities and public carriers will be used for the transportation of supplies, and provisions are made for this expenditure in the budget estimates. Moreover, a three ton truck is provided in each region. Within the zone, vehicles assigned to each sector will be used for the transportation of supplies.

Separate stores may be provided for insecticides, spraying equipment, laboratory equipment, drugs and other items.

Development of transport at different levels is given in the detailed plan. The number of vehicles allotted to East and West Pakistan depends on the extent of communication facilities. In West Pakistan provisions are made for one pick-up truck for each sector and light vehicles (jeeps) for field supervisors and zone staff (total 18). Provincial and Regional Headquarters will respectively be provided with 17 and 14 vehicles.

In East Pakistan the same number of vehicles is provided for Provincial and Regional Headquarters. At the Zones, however, the number of vehicles varies from 5 to 11. In addition, provisions have also been made for supervisory staff for motor boats in certain areas at 1-5 per zone (total 45). Moreover, local boats will be hired for transportation of spraying squads and surveillance agents.

Bicycles will be supplied to all squad leaders in West Pakistan and to zone squad leaders and supervisors working in dry areas of East Pakistan.

All the vehicles assigned to the project will be registered in the Central Transport Section, and Provincial and Regional Transport Officers will supervise their maintenance and repairs. Each vehicle will be provided with a driver and a log book will be maintained to keep records of the tools, spare parts; tires provided and the daily running, fuel consumption servicing and repairs carried out.

Workshops will be established in the Zones for minor repairs and in the Regions for major repairs.

7. Health Education

Provisions are made for Health Education for personnel from the Zone up to the National Headquarters. Health Education will be a continuous process initiated during or even before the preparatory phase, and maintained until malaria eradication is achieved.

The objective is to explain to the population as a whole the aim and procedure of malaria eradication and what are the immediate and long-term benefits to be expected.

Methods and approach to be used will be adapted to the different levels and classes of the population. In the official circles, and among the upper classes, the feasibility and desirability of Malaria Eradication will be strongly emphasized and every effort will be made to ensure the understanding and cooperation of the social welfare and scientific institutions and particularly of the medical profession, both in the Government and private practice. Mass media of information, such as radio talks, press releases, group meetings and conferences will be used for this purpose. The public will be kept regularly informed of the development and progress of the campaign.

Health Education at "COMMUNITY" level, that is, in the village where eradication activities are to be carried out, will require a different approach. The objective will be to explain to the people concerned that malaria eradication is not a superimposed health program, but a community undertaking which cannot succeed without their active and individual participation.

During the Preparatory Phase, the health educator will contact the headmen of the villages, the school teachers and the religious leaders and explain by direct talk to the people the entire process of malaria eradication. It will be emphasized that although spraying operations are the first step to be taken, malaria eradication will be later accompanied by a variety of operations of equal importance for its final success, and that any collateral benefits such as the reduction of house pests are only side effects and should not be considered as the aim of the campaign or the test of its efficiency.

During the Attack Phase villagers will be required:

- to prepare their houses and to accept and facilitate the spraying operations.
- not to wash or erase the insecticide deposits from the walls.
- not to replaster their houses after the spraying operations during the transmission season.
- to report the newly built houses or the houses unsprayed.
- to permit the malaria staff to enter their houses on request for routine investigations.

During the Surveillance and Consolidation Phase, cooperation of the population will include:

- the acceptance of blood film taken from fever cases of any other person if required and especially from infants.
- the acceptance of treatment.
- reporting of suspected cases to the surveillance agents by voluntary workers.

Special attention will also be given to the Health Education of all the staff engaged in malaria eradication.

Lectures on Health Education are part of the curriculum in the Training Centers for Senior and Junior Staff. Briefing of Malaria Inspectors, Squad Leader, and Spraymen will be ensured by the Health Educator at the Region or Zone level. All the Malaria Staff should know how to establish good relations with the public, how to gain their confidence, and how to answer any question relating to their own activities or to the main aspects of the Program.

8. Training of Personnel

Two training centers have been established, one in Dacca in the Malaria Institute, and the second in Lahore in the Institute of Hygiene and Preventive Medicine for training of the Senior and Junior personnel.

The training program will include academic, practical and field training for each senior and junior course to cover a period of three months according to the curricula, technical methods and procedures recommended by WHO.

Senior courses will be attended by malariologists, entomologists, engineers and other personnel possessing university degrees of comparable professional and academic qualifications.

Junior courses will be for field supervisors, sector chiefs, inspectors, assistant inspectors and comparable personnel.

Special courses will be provided for laboratory technicians (Haematology and Entomology).

Training of other field personnel, such as supervisors or squad leaders, will be carried out at the Region or Zone level.

In addition to their training at the training centers, all recruits will receive in-service field training in the Zones under operation. Medical Officers or other key personnel, such as sanitary engineers or entomologists may be deputed if needed for training in international courses or for field visits to Malaria Eradication Projects, in other countries with possible assistance from WHO, or other International Agencies.

9. Use of Antimalaria Drugs

Antimalaria drugs are now considered as an important adjuvant to malaria eradication measures. At the beginning of the Attack Phase, drugs will mainly be used to relieve the patients from their untoward symptoms and to induce the population to accept more willingly the eradication activities as a whole.

As soon as extensive blood surveys or fever case surveys are initiated, drugs administration will have the specific objective to deplete the reservoir of infection and to speed up the interruption of transmission.

When the third or the fourth year of the Attack Phase is completed and full surveillance instituted, the aim will be the radical cure of all confirmed cases.

Dosages and schedules of treatment will be devised accordingly.

During the first years the treatment will be a single dose treatment with chloroquine (or amodiaquine) and pyrimethamine (800 mg chloroquine or amodiaquine base and 50 mg pyrimethamine adults dose). The drugs will be given to the patient or suspected cases before blood film taking.

When surveillance has started, confirmed cases will be treated as follows:

<u>P. falciparum cases</u>	Three days course
chloroquine (base)	1st day 900 mg (in two doses) 2nd day 300 mg 3rd day 300 mg

<u>P. vivax and P. malaria cases</u>	Three days chloroquine course as above followed by: daily during 14 days.
Primaquine 15 mg	

(under medical supervision)

Effectiveness of treatment will be checked by followed up blood film examination carried out every two weeks for three months in P. falciparum cases and for four to six weeks in P. vivax or P. malariae cases.

This follow up survey is essential during the Consolidation Phase in order to ascertain the radical cure of the infection.

Experiments will be carried out to check whether it is possible to reduce the duration of the primaquine treatment to five days. Experience in other countries shows that primaquine can be safely given to children even one year of age in appropriate doses.

CHECK LIST OF STATUTORY CRITERIA

MALARIA ERADICATION

1. FA § 102. Proceeds will be employed only for items required for the project as specified in the Capital Assistance Paper.
2. FA § 201(b). Malaria is a debilitating disease which decreases the productivity of those affected. Its elimination therefore will increase productivity in all areas, particularly agriculture, where the disease is prevalent. (Section V.)
3. FA § 201(b) 4. This aid is being made available pursuant to consortium agreements.
4. FA § 201(b) 2. The activity is technically (Section II-C), economically (Section IV) and financially (Section V-A, B, C) sound. Pakistan may reasonably be expected to repay the loan at a reasonable rate of interest.
5. FA § 201(b) 3. Malaria is a debilitating disease which decreases the productivity of those affected. Its elimination therefore will increase productivity in all areas, particularly agriculture, where the disease is prevalent. (Section IV)
6. FA § 201 (b) 4. The project is a part of Pakistan's Five Year Plan. Its elimination is essential to increased agricultural productivity. (Section IV)
7. FA § 201(b) 5. Pakistan is making every effort to mobilize its internal resources for development of the country.
8. FA § 201(b) 6. All imports will be from the United States. (Section VII)
9. FA § 201(b). Pakistan has demonstrated great determination to systematically develop its economy and become self-supporting and there are reasonably good prospects for the repayment of the loan.
10. FA § 201(d). Funds shall not be reloaned.

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11. FA § 201(e). An application has been received with sufficient information to assure that funds will be used in an economically and technically sound manner.
12. FA § 201(f). The Malaria Eradication Program will promote the overall economic development through the enhancement of its agricultural and industrial productivity. (Section IV.)
13. FA § 201(f). All goods financed under the loan will be supplied by the U. S. private enterprise. (Section VII.) The program of malaria though is inherently a government function.
14. FA § 202(a). The program will assist the agricultural sector which is entirely private.
15. FA § 204. The loan meets all the criteria established by the DLC.
16. FA § 601. No direct effect in these areas.
17. FA § 601, 602. a) The project goods will be supplied by U. S. private enterprise and b) no direct effect on private U. S. participation in Foreign Assistance Program. The Loan Agreement will provide protection to small business.
18. FA § 604(a). All procurement of goods and services financed by the loan will be limited to the U. S.
19. FA § 604(b). The Loan Agreement will provide for limitation of the price of bulk commodity procurement to prices no higher than the market price prevailing in the U. S. at the time of purchase.
20. FA § 604(d). The Loan Agreement will only finance marine insurance purchased in the U. S. and will require purchases of marine insurance in the U. S. in the event of discrimination against U. S. marine insurance.
21. FA § 611(a) (1). Necessary Financial (Section V) and Implementation Plans (Annex II) exist. Cost estimates are reasonably firm (Section V and Annex I, A, B and C).
22. FA § 611(a) 2. No legislative action required.
23. FA § 611(b); APP #101. Not applicable.

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24. FA § 611(c). No construction will be financed under the loan.
25. FA § 619. This aid is pursuant to consortium arrangements.
26. FA § 620(a); APP 107. Pakistan is not providing assistance to Cuba nor are any of its ships stopping at Cuba.
27. FA § 620(b). Pakistan is not controlled by Communist Movement.
28. FA § 620(c). Pakistan is not indebted within terms of statute.
29. FA § 620(d). No productive enterprise is being financed.
30. FA § 620(e). Pakistan has not nationalized any U. S. property.
31. FA § 620(f); APP #109. Pakistan is not a communist country.
32. FA § 620(g). Funds not to be used to compensate owners for nationalized property.
33. FA § 620(h). Provisions are made in the loan agreement prohibiting any of the funds from being used to assist communist bloc activities or projects.
34. FA § 620(i). No determination has been made that Pakistan is engaging in or preparing for aggressive military efforts.
35. FA § 620(k). No productive enterprise will be financed.
36. FA § 620(l). Pakistan has instituted the Investment Guaranty Program.
37. FA § 636(b). Pakistan furnishes all local currency needs of all projects financed by A. I. D. and U. S. owned rupees are used for all A. I. D. administrative and program costs to the extent Pakistani owned rupees are available.
38. APP #102. Not applicable.
39. APP #104. Funds not to be used for paying pensions.
40. APP #111. Not applicable.

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41. APP #112. Not applicable.
42. APP #114. Loan funds will not be used to pay UN assessments.
43. APP #117. This loan will be made from appropriated funds.
44. APP #118. Regulations on employment of U. S. and local personnel will be complied with.
45. APP #701. No funds will be used for publicity within U. S. nor heretofore authorized by Congress.