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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D.C. 20523

CAPITAL ASSISTANCE PAPER

Proposal and Recommendations
For the Review of the
Development Loan Committee

PAKISTAN - MALARIA CONTROL

AID-DLC/P-2073

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DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

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AID-DLC/P-2073

March 6, 1975

MEMORANDUM FOR THE DEVELOPMENT LOAN COMMITTEE

SUBJECT: Pakistan - Malaria Control

Attached for your review are recommendations for authorization of a loan to the Government of Pakistan ("Borrower") of not to exceed thirty-five million United States dollars (\$35,000,000) to assist in financing the foreign exchange costs of goods and services required to support a multi-year program of malaria control in Pakistan.

This loan is scheduled for consideration by the Development Loan Staff Committee on Friday, March 14, 1975. Also please note your concurrence or objection is due at the close of business on Wednesday, March 19, 1975. If you are a voting member, a poll sheet has been enclosed for your response.

Development Loan Committee
Office of Development
Program Review

Attachments:

Summary and Recommendations
Project Analysis
ANNEXES - A - N

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MALARIA LOAN

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SUMMARYPAKISTAN - MALARIA CONTROLSUMMARY AND RECOMMENDATIONS

1. Borrower and Grantee: The Government of Pakistan (GOP)
2. Amount of Loan: \$35,000,000^{1/}
Amount of Grant: Rs. 250,000,000^{2/}
(Mondale Rupee Grant)
3. Terms of the Loan:
 - A. Maturity: 40 years, including a 10 year grace period.
 - B. Interest: 2% per annum during grace period.
3% per annum thereafter.
 - C. Currency: Interest and principal payable in U.S. dollars.
4. Financial Plan:

(Five year cost in millions of U.S. dollars)

	<u>Foreign Exchange</u>	<u>Local Currency</u> (equiv.)	<u>Total</u>
GOP/Provinces	27.4	8.2	35.6
AID Loan	35.0	-	35.0
U.S.-owned Rupee Grant	-	<u>25.3</u>	<u>25.3</u>
	<u>62.4</u> ^{3/}	<u>33.5</u>	<u>95.9</u>

^{1/} Due to funding limitations, it is anticipated that less than \$35 million will be available under Section 104 (Health and Population) for authorization in FY 1975. Thus, upon approval by the Development Loan Committee of the \$35 million loan recommended herein, A.I.D. will proceed to authorize the maximum amount available from FY 1975 funds (not to exceed \$35 million), and then amend that authorization to provide the balance required for the project when additional funds become available.

^{2/} 9.9 Pak Rupees = U.S. \$1.00

^{3/} Does not include WHO \$1 million contribution for technical assistance.

5. Objective of the Program.

The program seeks, within a five year period, to reduce the incidence of malaria to a level where the disease is a minor factor in Pakistan's overall health situation and can be prevented from resurgence thereafter by minor public fund outlays. Achievement of this objective will be indicated by surveys which indicate that active malaria parasites are present in blood samples no more frequently than 500 instances per one million of population.

6. Description of the Program

The program is a five year effort to bring malaria under control by a large scale program of (1) spraying the interiors of rural homes with residual insecticides; (2) continuous surveillance of the population at risk to malaria to detect cases of the disease; (3) treatment of cases detected; (4) advice and assistance to urban malaria control efforts; (5) research and (6) health education.

The five year program will cost an estimated \$96.7 million (including AID's assumed cost escalation factor) of which foreign exchange expenditures will account for \$63.2 million and local currency outlays \$33.5 million. AID's assistance to the program will be comprised of a dollar development loan of \$35 million and a U. S. -owned "Mondale rupee" grant equivalent to \$25.3 million. The World Health Organisation (WHO) is expected to provide, on a grant basis, twenty five man years of the services of five WHO specialists. The GOP and provincial governments will provide the balance required : \$27.2 million in foreign exchange and \$8.2 million for local currency costs.

7. Purpose of Dollar Loan and U. S.- Owned (Mondale) Rupee Grant.

- (a) The loan will finance up to 60% of the foreign exchange costs of the program for the first three years (1975-77) to a maximum of \$35 million. The loan will help meet the costs of imported insecticides and insecticide sprayers. Technical assistance not provided by WHO will also be financed by the AID loan.
- (b) The grant - By a separate action, it is proposed that approximately Rs. 250 million be provided from U. S. - owned rupees generated under PL 480, Section 104 (f) a "Mondale" allocation to meet approximately 73% of the local currency costs of the program. (Pakistan's Federal and Provincial Governments will, in addition, make available physical facilities already in place). The U. S. rupees will be made available over five years.

8. Statutory Criteria: Met. See Annex "L".
9. Environment Assessment: See Annex "G".
10. Issues: None
11. Recommendation:

Authorization of a dollar development loan not to exceed \$35 million and a grant of U.S.-owned (Mondale) Pakistan rupees in the amount of Rs. 250 million.

CAPITAL ASSISTANCE COMMITTEE

- USAID/PAKISTAN: Francis J. Murphy, Public Health Officer (Chairman)
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INTRODUCTION AND BACKGROUND

A program aimed at total eradication of malaria was begun in Pakistan in 1961. The target date for eradication was set for 1975. The program began with World Health Organization (WHO) and GOP agreement on a Plan of Operations for the fourteen year period. For the first half of the period, 1961-1967, the program's success in reducing malaria was major and Pakistan's accomplishment in halting the transmission of malaria was widely hailed.

AID's assistance was instrumental in the initial success of this malaria program providing badly needed commodities and services. In West Pakistan through grants and loans AID provided assistance amounting to over \$28 million in the period from 1963 to 1970. Annex E provides details of this assistance.

Whereas in 1961, it had been estimated that as many as 7 million people suffered from malaria each year, by 1967, this figure had been dramatically reduced to about 9,500 cases. The decline in cases was accompanied by a corresponding drop in the parasite rate (i. e. in the percentage of persons whose blood samples showed malaria parasites) from 15% to under 0.1%.

By 1969, however, areas where malaria had been reduced began to show evidence of resurgence of the disease, particularly in the Punjab and Sind provinces. This resurgence was related to a complex of technical and management problems, stemming from inadequate financing of the "maintenance phase" of the program supply and equipment maintenance difficulties, an increase in urban malaria, an increase in vector resistance to DDT, administrative rearrangements that proved unworkable, the lack of a permanent health infrastructure to ensure continuation of eradication efforts, and personnel shortages.

At the present time, malaria has again reached epidemic proportions, and its resurgence is as yet unchecked, especially in the heavily populated rural areas of the country. The annual parasite incidence (API) rate has risen to a current estimate of 26.31%. Malarious conditions are regarded as worse than the conditions which existed in 1961. Annex B graphically illustrates the incidence of malaria in 1967 when the disease was under control and in the 1973 epidemic.

Although estimates of malaria cases vary, it is believed that Pakistan had as many as 10 million cases in 1974. If unchecked and transmission patterns of the disease were to follow those in the past, the number of cases might rise to 23 million by 1979. The economic and financial costs of such an epidemic are enormous in terms of lost production when workers are absent or debilitated and in terms of increased health costs for treatment of the millions of cases. There is an obvious humanitarian concern as well, not only in sparing victims the suffering of the disease but also premature death which often occurs when the virulent

falciparum form of the disease is contracted. There are no reliable statistics on the number of deaths due to malaria in 1974 but it is believed likely they numbered in the thousands.

In 1973, partly as a result of the devastating floods of that year, Pakistan experienced a major epidemic of malaria in the flood-affected Punjab and Sind provinces. The GOP became greatly concerned and in the summer and fall of 1973 held a series of meetings with provincial officials to draw up a strategy and to prepare a revision to the 1961 original Plan of Operation. These meetings among GOP and provincial health officials with World Health Organization (WHO) technical advice, resulted in the Revised Plan of Operation (hereinafter referred to as the RPO) for a five year 1975-1979 extension of the original fourteen year program.

The Government of Pakistan, in preparing for support of the activities included in the RPO requested renewed AID assistance in financing the substantial foreign exchange and local currency costs of the program. In the spring of 1974, the AID Mission in Pakistan invited a Team of malaria experts to review the strategy of Pakistan's new Plan of Operations and evaluate its implications with respect to financial and administrative capabilities. The Team visited Pakistan from May 26 through June 14, 1974. The conclusion of the Team was that "the program concept presented in the Extension to the Plan of Operation' document is viable and reasonable -- even the present widespread epidemic situation, and the limited resources available". The Team felt that, if properly implemented, the activities described in the RPO would result in lowering the malaria rates to satisfactory control levels within three years.

* The team was composed of Dr. Eugene F. Campbell, Consultant to the A. P. H. A., Dr. Andre Lebrun, Professor of Epidemiology, Medical College of Wisconsin, and John Stivers, Technical Assistance Bureau, AID/W.

II. PROGRAM

The program, as laid out in the RPO, is a joint effort of national malaria headquarters (to be known as the Directorate of Malaria, a branch of the Ministry of Health and Social Welfare) and the provincial malaria organizations. The program will last five years, the first three years calling for very substantial expenditures to finance wide-scale spraying of the interiors of rural homes. The last two years in most areas, would be limited to "focal coverage", that is spraying only where concentrations of cases are detected.

The RPO reflects a basic change in Pakistan's approach to malaria. The objective is "control" rather than "eradication". Malaria control means reducing the incidence of disease rather than the prevention of all cases and therefore is a less costly and more easily managed effort. Eradication might follow a period of the disease being under "control" if national health priorities so dictated.

Another change from the malaria program of the 1960's is that most activities will be carried out by the provincial malaria groups with the federal Directorate of Malaria - DOM - in charge of technical auditing, inter-provincial coordination, dealing with international agencies, overall evaluation, training and research.

The objective of the RPO is to reduce the incidence of malaria to a point, within five years, when blood sample testing reveals no greater incidence of active parasites in blood samples than 500 per one million of population. This "API" or annual parasite incidence rate is the WHO criterion for having achieved "strong control". At such a rate, by 1980 when Pakistan's population will be in excess of 80 million, the number of active parasite cases would thus be 40,000. (This compares with the number of cases detected in 1967 at the time of the earlier program's greatest effectiveness: 9,500).

The RPO sets forth plans for a number of separate activities which are described below:

A. Spraying.

The interior walls of rural and village homes will be sprayed with a residual type insecticide (DDT, malathion, benzene hexachloride-BHC) at periods during the year when mosquito densities are at their greatest and the transmission of malaria therefore most likely. The number of times an area will be sprayed will be determined by its malariogenic potential (high, medium or low, see Annex "L" for a map of Pakistan's current areas of malariogenic potential). The type of insecticide used will be based on vector susceptibility which will be regularly assessed.

The spray operation schedules for the three major categories of areas to be sprayed are as follows:

1. Areas of high malariogenic potential (57% of population)
 - 3 to 4 years of total coverage followed by
 - 2 to 3 years of focal coverage (10% of total coverage)
2. Areas of medium malariogenic potential (30% of population)
 - 2 years of total coverage followed by
 - 1 year of selective coverage (25% - 40% of total) followed by
 - 3 years of focal coverage.
3. Areas of low malariogenic potential (13% of population)
 - 1 to 2 years of total coverage followed by
 - 1 to 2 years of selective spraying followed by
 - 3 years of focal coverage.

The work plan for spraying in the first operational year of the plan is as follows:

	<u>Provinces</u>				
	<u>Punjab</u>	<u>Sind</u>	<u>NWFP</u>	<u>Baluchistan</u>	<u>Azad Kashmir</u>
% houses to be sprayed with DDT	10	30	10	44	100
% houses to be sprayed with BHC	67	70	50	56	0
% houses to be sprayed with Malathion	23	0	40	0	0

B. Surveillance Operations - Case Detection.

Malaria surveillance operations to detect cases of malaria, provide the necessary epidemiological information for proper program planning and evaluation. They are also essential to the effective administration of anti-malaria drugs. These operations take two forms: Active Case Detection (ACD) and Passive Case Detection (PCD).

The ACD operation is to be conducted, as in the past, on a monthly basis by a malaria house visitor covering approximately 10,000 persons, equivalent to a sub-sector.* A group of 4 to 5 sub-sectors (equivalent to a sector) is supervised by a malaria inspector. A group of sectors is supervised by a Zone Office and corresponds to a political District. Regular schedules of work and supervising activity are maintained for each work day. As the house visitor makes his daily rounds he actively searches for fever cases, takes blood slides, and provides presumptive treatment to the fever case, with anti-malaria tablets (chloroquine). If upon examination a patient's blood slide is positive, arrangements are made for radical treatment by the malaria inspector, necessary focal spraying, epidemiological investigations, and contact surveys. This group of personnel will become the basic communicable disease control mobile field staff of the general health services in an integrated scheme.

The Passive Case Detection (PCD) operation is carried on at present by health institutions and is aimed at blood slide collections from fever cases visiting or attending clinics at health centers, hospitals and health posts. At present, these institutions do not fully participate in the malaria PCD program but it is planned that their role will be expanded over the project period through Ministerial instructions, increased contact with malaria officers, health education, and training courses for medical, public health and malaria workers.

C. Treatment of Malaria Cases.

The treatment program for Pakistan includes presumptive treatment of a single adult dose of 600 mg. of 4-aminoquinoline (chloroquine or amodiaquine). Radical treatment for the present time will consist of a three day treatment of chloroquine (1500 mg. adult dose). Mass chemoprophylaxis on a weekly or fortnightly basis to high risk groups of infants under 5 years of age, and nursing mothers may be considered in areas with a high incidence of the more dangerous P. falciparum. Mass radical cures are to be applied on a limited basis to assist in eliminating malaria in problem areas of persistent foci, in focal outbreaks in consolidation/maintenance areas, and in situations associated with population movements or aggregations of people. Mass

* This large number is possible because of the density of the population living in rural houses.

drug administration is considered a secondary supplementary attack weapon and is not a substitute for proper spraying. There is no documented evidence of chloroquine-resistant malaria parasites in Pakistan.

D. Continuous Evaluation.

Systems for continuous evaluation of the program's effectiveness have been built into program plans. With respect to case detection, intensified ACD and PC D, together with improved supervision, will bring to light areas of the program which are not responding to insecticide spraying or identify areas which can be withdrawn from spraying operations. The system and operation and management of the laboratories will be constantly evaluated in order to assure accurate results from the slide collections. These laboratory evaluations have already been initiated and refresher/in-service training courses have been organized for microscopists. Spray operations will be subjected to both concurrent and consecutive supervisory efforts to obtain proper and total spray coverage. Overall program evaluation will be provided through a system of monthly, quarterly and semi-annual review meetings (see Section VI, Loan Administration).

E. Research.

A program of both basic and applied malaria research is planned by the DOM and will provide epidemiological and entomological knowledge on malaria. Studies will include insecticide susceptibility, vector investigation in problem areas and the use of alternate methodologies, the sensitivity of *P. falciparum* (a parasite of the virulent type of malaria) to anti-malaria drugs, the role of secondary malaria vectors, the use of immunofluorescence assessment techniques and the impact of malaria on economic development. The research activities set forth in the RPO have been reviewed by the WHO and the 1974 special AID review team and judged to be sound and adequate. Research activities will also include an investigation into the potential for vector source reduction through improved water management, larviciding and draining and filling of water sources. This is because the program emphasizes the importance of coordination between health and public works personnel, to assure that planning for irrigation schemes and urban water systems takes malaria program objectives into account. Work will also be continued at the Medical Research Laboratory in Lahore on genetic methods of vector control.

* See Annex "C" Summary and Conclusions of the AID Malaria Review Team, 1974.

F. Training.

To assure that malaria workers are fully trained in the techniques of control, program management and objectives, the GOP will provide funds for in-service refresher training of existing staff as well as the training of new personnel. The Malaria Eradication Training Center (METC) in Lahore which is attached to the Institute of Hygiene and Preventive Medicine (IHPM), will continue the pre-service training of supervisory staff at both the professional and sub-professional levels. The METC will be supervised by the DOM. Public Health personnel will also be trained in malaria activities and theory at the METC. Malaria workers, for their part, will be trained in the preventive aspects of public health at the IHPM and in their own districts and provinces. International training needs will be identified as the program progresses.

G. Health Education.

The RPO calls for a health education program to be designed to familiarize the general public, through key officials, unions and community social organizations, with the causes of malaria, the methods of prevention and the activities of the malaria control program. Specific plans for the education effort have not yet been drawn up.

H. Place of Project in U.S. Program and Country Priorities.

Pakistan would experience disastrous economic and social effects if malaria were allowed to spread at the present rate. Disease on the scale of Pakistan's malaria problem affects all sectors of the economy. Both agriculture and industrial production are reduced, as millions of persons suffer the debilitating effects of the disease. The effect on agriculture is especially pronounced, since much of the malaria occurs during the critical periods of planting and harvesting.

In crowded urban areas, malaria results in absenteeism among factory workers and government employees, as well as sickness among school children. Large expenditures are necessarily made from family incomes for treatment and medicines.

The Government of Pakistan has recognized that a renewed full-scale attack on malaria is imperative if the present major epidemic is to be brought under control. The Government has also recognized that the longer-range objective of malaria eradication can only be attained if malaria control efforts become a part of a broad national health program.

III. BORROWER AND EXECUTING AGENCY:

A. General Organization:

The Borrower is the Government of Pakistan (GOP). The GOP agency responsible for the execution of the project, including the procurement of project commodities, is to be the Directorate of Malaria (DOM) of the Ministry of Health. (See Organization Chart Annex 'C').

Executive action now in progress will charge the DOM with countrywide functions in technical auditing, coordination among provinces, liaison with international agencies, over-all evaluation, training, and research activities. The DOM will be authorized to assure uniformity of operations in all the provinces and will make country-wide technical policy decisions. It will also approve plans for controlling malaria in urban areas.

The Provincial Health Departments, operating under the guidance of the DOM, will draw up and execute the annual malaria control plans of action for their respective provinces. The annual provincial plans of action will be submitted to the central Health Ministry for approval. The Health Ministry will have the power to amend, modify or alter the annual provincial plans of action.

With respect to organization and staff, each province has a provincial malaria eradication office headed by an experienced medical officer. The Provincial malaria operations are divided into Zones which usually correspond with the political boundaries of the provincial districts. The Zones are headed by medical officers or senior malaria specialists with many years of experience in malaria work. A Zone normally covers a population from 500,000 to 1,500,000 people. As the malaria program is integrated into the national health service, it is envisioned that the malaria zonal officer will become the equivalent of a Deputy District Health Officer and will be responsible for all communicable diseases and carry out other public health duties as required in the District. The senior staff of the malaria organization will be absorbed into the District Health Organization while the field staff (malaria supervisors) will become the core of the basic health services performing malaria maintenance, limited immunization services, vital statistics collection, health education and other duties at the village level.

B. Capability of Executing Agency:

The central and provincial malaria eradication services now have the experience and technical capabilities required to carry out an effective malaria control operation.

The Provincial malaria organizations, which will execute the field program under the overall guidance of the DOM, have the basic staff to carry out their assignments. Provincial staffs will need to add supplementary Zonal and Sector personnel, however, during the course of the extended five year Plan of Operation, but no difficulty is expected in recruiting and training

the additional personnel. Provincial organizational machinery is already in place, with offices, field stations, work schedules, storage areas, maintenance shops and defined work boundaries.

Provincial implementation of the program will facilitate the functional integration of malaria control into general health activities. With respect to integration, the "temporary employee" status of malaria workers has been a particular problem in the past, causing high turnover of staff, especially in the professional ranks. In drawing up the revised Plan of Operation, the GOP concluded that its country-wide malaria program could not be successful in the long run unless the staff were given (1) permanent government employee status, leading to (2) service in the permanent ongoing health program. The first step has already taken place, malaria workers attaining civil service status on July 1, 1974.

A major shortcoming of malaria control/eradication efforts in the past was the lack of adequate transport for malaria personnel and equipment. The malaria program's vehicle situation on May 1, 1974 was as follows:

<u>Province</u>	<u>Vehicles Total</u>	<u>No. of Vehicles in operation</u>	<u>No. of vehicles under repair</u>	<u>No. of vehicles not repairable</u>
WHO	4	4	-	-
Punjab	213	110	62	41
Sind	73	23	25	25
N. W. F. P.	80	52	6	22
Baluchistan	16	13	3	-
	<u>386</u>	<u>202</u>	<u>96</u>	<u>88</u>

The new Plan of Operation calls for replacement of vehicles now unserviceable and yearly replacement of those which become unserviceable in the future. The majority of the vehicles which AID financed for the program in the 1960's are now 8 to 10 years old. Improved vehicle operation and maintenance will be a major emphasis under the new program.

A shortage of spraying equipment is another acute problem. It is estimated that approximately 4,000 - 5,000 spray units will have to be procured over the next two years with an additional 2,000 - 3,000 sprayers required by 1977. There has been no major procurement of spraying equipment or vehicles by the GOP since 1963.

Training is another area of emphasis of the new Plan of Operation. The DOM will assume responsibility for the national Malaria Eradication Training Centre (METC) in Lahore. One of the advisers WHO has agreed to provide will be an experienced technical officer stationed at this Centre to assist the program with its training needs. Since 1961, the METC in Lahore has directly trained or, by providing staff, participated indirectly in the training of approximately

5,300 medical and paramedical personnel. Supplementary advanced training requirements in public health, epidemiology, entomology, and other professional fields will be identified as the program moves forward and it is expected these needs will be met by WHO and other donors if such training is not available in Pakistan. Each of the yearly plans of action will set out in detail the minimum training requirement expected to be met during program implementation. Basic practical spraying training will be carried out at the beginning of each spray cycle by Zonal and Sector staff in conjunction with spray team leaders who will then instruct the field supervisors. Special programs of training will be developed for each different type of spray operation e.g. house spraying, and larviciding.

In brief, the renewed malaria control program has been designed with past shortcomings in mind. Experienced manpower is available to carry out the country-wide program. Necessary insecticide, vehicles, spraying equipment and other supplies plus expatriate technical assistance are provided for by the combination of funds from the GOP, WHO and AID. The formation of the DOM, retraining of workers, and external technical assistance, plus close GOP-AID-WHO monitoring and evaluation should assure that past problems in program administration are not experienced in the new program.

The USAID Director has certified, in accordance with Section 611 (e) of the Foreign Assistance Act, to the capability of the GOP to carry out this project. See Annex 'M'.

IV. PROGRAM ANALYSIS

A. TECHNICAL ANALYSIS

1. General

Although the Government of Pakistan refers to the program in terms of malaria eradication, the extended five year program in fact aims at malaria control, assigning eradication as goal for some later date.

The objective for reduction of malaria cases over the five years is to lower the incidence to no more than 500 cases per 1 million of population by 1979. Based on the expectation that the population will reach about 80 million by 1979, the number of cases would be approximately 35-40,000, down from the 1974 estimate of 10 million cases. Such an objective should be attainable based upon the experience in the 1960's, when cases were reduced from 7 million in 1961 to 9,500 in 1967. Its attainment during the next five years, however, will be dependent upon a number of factors: among them, the availability of pesticides, the continued susceptibility of malaria vectors to the pesticides being used, adequate equipment maintenance, epidemiological information, training, research and health education.

By 1978/79, the fifth year, the program will have achieved a level of malaria control for Pakistan which will reduce the annual insecticide requirements to approximately 800 MT of Malathion, 150 MT of DDT and 4 MT of BHC (requiring an expenditure of less than \$ 2 million), which are substantially down from the average 7,100 MT of Malathion, 1,200 MT of DDT and 30 MT of BHC (approximate \$20 million expenditure) required on the average, during the 1975-1977 period.

Malaria vector susceptibility to the pesticides selected for the program is a matter which will require continuous attention through out the five-year program. There is already vector resistance to DDT in many areas of Pakistan and this has required the substitution of malathion, a far more expensive and less long-lasting pesticide than DDT. The use of malathion as a substitute is supported by GOP susceptibility tests on the primary mosquito malaria vectors - A. stephensi and A. culicifacies. The validity of these test data was reviewed in depth by the AID Malaria Consultant Team which visited Pakistan in the spring of 1974. Under the earlier Malaria Eradication Program susceptibility testing was carried on continuously from the beginning of the program and resistance to DDT/BHC was reported after the rising malaria rates signalled a malfunction. The RPO calls for careful susceptibility testing using the standard test procedure outlined by the WHO. With increased efforts in susceptibility testing it may be possible in some areas to return to DDT spraying.

2. Availability of Pesticides.

Based on reports over the last several months, indications are that the principal imported pesticides needed for Pakistan's malaria control

program are in short supply worldwide and will continue to be so for the next two years. The sole U.S. manufacturer of malathion, American Cyanamid, has indicated that in 1975 the company would be able to supply about half of Pakistan's requirement. However, because of delays in the program, there will be only one round of spraying instead of two. It is expected that the American Cyanamid supplied malathion will cover the program's requirements for the first year (1975).

Benezene hexachloride (BHC) is in even shorter supply, at least in the U.S. and Japan. Of Pakistan's 1975 requirement of 2,813 MT, the only amount that appears to be available is 150 MT from Japan.

If these shortages in fact continue, Pakistan may be forced, in 1976, to scale down the scope of its spraying program. Specific plans will need to be drawn up when the exact quantities of pesticide available are known. However, optional spraying programs are already under consideration. One alternative plan would be to spray all malarious areas in Pakistan one time during the year, choosing as the time for spraying the beginning of the two-month period when the mosquito population is at its peak. Another alternative would be to exclude from the spraying program areas of low malariogenic potential.

Malariologists agree that these alternative plans will not reduce the incidence of malaria as rapidly as the GOP considers desirable and has targeted in the RPO, but they will show a positive effect in the short run. In the long run, with one additional year of full coverage spraying, if required, the objectives of the RPO should still be met within the five-year plan period of the RPO.

Before the 1975 spraying season begins, the GOP with the assistance of WHO will carry out a nationwide entomological survey to refine plans for the year. These data plus what becomes known about the availability of pesticides in the months ahead will enable DOM officials to draw up plans to make the most effective use of the pesticide quantities they are able to procure.

3. Environmental Effects.

The conclusions of the AID environmental assessment (see annex "G") are that the benefits to be derived from properly controlled use of insecticides in the program greatly outweigh the potential risks.

4. Conclusion

It is the conclusion of AID that the program as set forth in this paper is technically sound and the objectives as stated can be reached.

B. FINANCIAL ANALYSIS

1. Alternate Sources of Financing.

In addition to AID, the World Health Organization (WHO) and the Government of the Federal Republic of Germany have expressed interest in helping finance the program. The WHO, at the request of the GOP, plans to provide twenty five man-years of direct Technical Assistance to the program in addition to the services of the WHO Country Malaria Director. We estimate the WHO contribution to the program to be approximately \$1.0 million. (A CP of the loan agreement will call for the GOP to request WHO assistance) While a contribution to the program from Germany is expected at a later stage, it is not anticipated that it will be substantial, i. e. over a million dollars.

2. Program Cost.

BY AID's calculation, the five year Malaria Control Program is projected to cost \$95,695,000 (as described below), of which \$62,245,000 is for foreign import and the balance, \$33,450,000 (Rupee equivalent) is for local currency costs.

<u>Foreign Exchange</u>	(000's of \$)
Malathion Pesticide	53,863
BHC Pesticide (imported)	6,264
Vehicles	1,197
Sprayers	450
Laboratory Equipment	20
Technical Assistance	<u>450</u>
	62,245
<u>Local Currency</u>	
DDT	5,774
BHC (domestic)	5,002
Administration	<u>22,674</u>
	33,450
Total	\$ 95,695 =====

FIVE YEAR MALARIA CONTROL PROJECT
Foreign Exchange Requirements

<u>Commodity Item</u>	<u>First Three Years Cost</u>	<u>Escalation 15%</u>	<u>First Three Years Escalated Cost</u>	<u>Fourth and Fifth Years Cost</u>	<u>Escalation 20%</u>	<u>Total Five Year Escalated Cost</u>
Malathion <u>1/</u>	\$43,295,034	6,489,755	49,754,789	3,423,154	684,631	53,862,574
BHC <u>2/</u>	\$ 5,447,202	817,080	6,264,282	-0-	-0-	6,264,282
Total Pesticides	\$48,712,236	7,306,835	56,019,071	3,423,154	684,631	60,126,856
Technical Assistance	450,000	-0-	450,000	-0-	-0-	450,000
Vehicles <u>3/</u>	989,250	-0-	989,250	207,900	-0-	1,197,150
Sprayers <u>4/</u>	450,000	-0-	450,000	-0-	-0-	450,000
Laboratory Equipment	20,000	-0-	20,000	-0-	-0-	20,000
Total FX	\$50,621,486 =====	7,306,835 =====	57,928,321 =====	3,631,054 =====	684,631 =====	62,244,006 =====
AID Contribution <u>5/</u>			34,756,993			34,756,993
GOP FX Requirements			23,171,328			27,487,013

- 1/ Malathion requirement for the first three years is 21,423 MT and for the fourth and fifth years it is 1695 MT. Malathion cost based on current quotation from American Cyanamid received by the Mission, \$1587.60 MT plus average \$431.96 shipping charge.
- 2/ Imported BHC (3617 MT) is required only for the first two years of the project. The CandF price of \$1506 MT for BHC 26% water wettable powder was made available to USAID by the D. O. M.
- 3/ See Annex J for detailed vehicle requirements and respective costs.
- 4/ 8000 Hudson sprayers are required. Total costs indicated are computed at \$42 per sprayer CandF Karachi, plus 20% for spare parts and a further contingency of 5%.
- 5/ The AID contribution is computed at 60% of the first three year's foreign exchange requirement, not to exceed \$35 million, i. e. loan amount.

FIVE YEAR MALARIA CONTROL PROJECT
Local Currency Requirement (in Rupees)

	<u>FIRST YEAR</u>	<u>SECOND YEAR</u>	<u>THIRD YEAR</u>	<u>TOTAL FIRST THREE YEARS</u>	<u>FOURTH YEAR</u>	<u>FIFTH YEAR</u>	<u>PROJECT TOTAL</u>
DDT <u>1/</u>	26,509,950	11,836,000	11,391,800	49,737,750	4,475,250	2,953,650	57,166,650
BHC <u>2/</u>	13,321,268	21,089,160	14,662,230	49,072,658	410,916	45,200	49,528,774
	=====	=====	=====	=====	=====	=====	=====
Total Pesticide	39,831,218	32,925,160	26,054,030	98,810,408	4,886,166	2,998,850	106,695,424
Administration ^{3/}	47,310,000	50,851,500	48,899,150	147,060,650	38,157,656	38,978,926	224,197,232
Total Rs.	87,141,218	83,776,660	74,953,180	245,871,058	43,043,822	41,977,776	330,892,656
AID Contribution	65,838,000	63,296,000	56,629,500	185,763,500	32,521,000	31,715,500	250,000,000
GOP Rs. Requirement:	21,303,218	20,480,660	18,323,680	60,107,558	10,522,822	10,262,276	80,892,656

- 1/ DDT costs based on quotation of Rs. 13,450 MT received by GOP from the domestic source. Ten percent escalation has been used to compute costs for the 2nd through 5th years.
- 2/ BHC costs based on quotation of Rs. 7,718 MT received by GOP from domestic source. Ten percent escalation has been used to compute cost for the 2nd through 5th years.
- 3/ Administration costs have been escalated 5% a year although it should be noted that inflation will probably exceed this rate.

Note that the above figures do not correspond precisely to the figures in the Cost-Benefit Analysis which follows. The major difference is accounted for by the compounding of the rate of price escalation. In this financial analysis, foreign exchange costs were escalated by 15% overall for the first three years and 20% overall for the last two years. Local currency costs are escalated by 10% per year. The GOP's own calculation of the total cost in its government approval document is the equivalent of \$85.9 million taking no price escalation into account.

The largest component of the program is the pesticide malathion, which is projected to cost \$53,863,000. Forecasting malathion costs is particularly difficult because the price has increased very sharply over the last year; for example, the price increased from 44.9¢ a pound in September 1973 to 72¢ a pound by March 1974. These prices were quotations received by the GOP during the recent attempts to secure 1,000 tons of malathion under the AID Commodity Loan. In projecting costs for this Paper, the 72 cent per pound FAS price was used. The price per metric ton on this basis is \$1,587.60 not including \$431.96 which must be added for freight. Future price escalations have been assumed as explained above.

3. Financing Plan

The AID loan will meet up to 60% of the foreign exchange requirements of the first three years, upto a maximum loan amount of \$35 million. It is proposed that the AID loan finance pesticides, sprayers and technical assistance. Vehicles will be procured with GOP foreign exchange funds, to expedite procurement and to acquire right-hand-drive vehicles from non-U.S. sources.

It is planned that the AID loan funds will be released for the program in three annual tranches when conditions precedent for each year's disbursements have been met (See Section VI.A). Funds will be released by AID either on a reimbursement basis or on a 60/40 AID/GOP concurrent-sharing basis, jointly meeting foreign exchange costs as they are incurred.

In addition to the loan, AID intends to make a US owned rupee grant (Mondale) of Rs.250,000,000 (\$25.25 million equivalent) to help Pakistan pay the local currency requirements for the five years of the program. Disbursement by AID of the rupee funds will be a subject of the annual review meetings in June. Based on agreement at the meetings by the GOP and AID, annual disbursement schedules will be established or revised so that program needs are met and the GOP contribution is assured. will be made by AID at the beginning of each fiscal year.

It is also important to note that AID rupee grant is intended to assist the program in the critical first five years when a full and expensive attack on malaria is required. After that period, it is planned that the continuation of the GOP contribution at a level close to that of the last year will enable the GOP to continue an effective malaria "maintenance program".

C. ECONOMIC ANALYSIS:

Although the application of economic analysis to health sector programs runs into difficult problems in the quantification of costs and benefits, the economic (as distinguished from the humanitarian) desirability of a malaria control program can be clearly established.

The analysis of the proposed program is limited to those direct economic benefits derived from malaria control which can be readily quantified. These are :

- a) The benefits derived from reducing or avoiding losses of production, in the form of days lost when a worker is ill, hours of a work day lost when a worker is debilitated and years lost as a consequence of early death.
- b) The benefits derived from avoiding the cost of treatment.

The costs and benefits are as follows:

(million of dollars)

<u>FY</u>	<u>Total Costs*</u>	<u>Total Benefits</u>	<u>Net Benefits</u>
1974/75	22.24	57.07	34.83
1975/76	31.34	115.05	83.71
1976/77	27.61	161.21	133.60
1977/78	6.91	208.18	201.27
1978/79	<u>6.75</u>	<u>248.89</u>	<u>242.14</u>
	94.85	790.40	695.55

(The calculation of the benefits is explained in Annex II)

It is clear that the returns in any given year are far greater than the cost. Even in the first year, when returns are lowest, the project shows a simple return of over 155%.

The simple benefit cost ratio for the malaria control program is 8.3 to 1, and the discounted (10%) benefit cost ratio for the program is 6.6 to 1, without counting any benefits after 1979. Even using very extreme assumptions the ratio remains favorable. Illustratively, if the program were only 80% effective, and the program's cost was increased by a factor of five, the internal rate of return of the program would be 30%. Because this project prevents deaths and lost production, the returns are high and immediate. If the project were not executed, losses from a high incidence of malaria would be substantial -- if the project is executed these losses will be avoided. To obtain the benefits, no unusual or innovative actions or new complementary

* For this economic analysis, projected costs have not been increased for general price inflation because the same increase would apply to the valuation of the benefits, leaving the ratio between them unchanged.

investments are needed. The project is worthwhile in economic terms even if it were not to accomplish all of its goals and even if five years later it had to be repeated because enough benefits are gained in the five years of the project to more than pay for the project costs many times over.

Cost Effectiveness

The malaria program for a cost of \$95 million will provide protection to 90% of Pakistan's population. The per capita cost of malaria prevention over the 5 year period is approximately \$1.35 (Rs. 13.00). The annual per capita cost is roughly 27 cents (Rs. 2.67). Looked at from another perspective, the project will avoid over 67 million cases of malaria at a cost of about 80 cents per case avoided.

The \$95 million cost is applied against cases avoided during the active life of the project. If cases are avoided in future years, then the cost per case avoided is even lower. Should the project not succeed in keeping the incidence of malaria down to a negligible level in future years and the project has to be repeated, that would be unfortunate, but the project is still economic.

Distribution of Benefits Over Income Groups

The benefits of this project will flow largely to the poorer groups, who cannot afford to buy insecticides, screening, and similar protective devices. The evidence is that the incidence of malaria is heavily concentrated upon the urban and rural poor. Benefits by specific income groups cannot be defined with any precision at this stage. Quantification of the distribution effects can be made more explicit after the project (which includes specific evaluation procedures) is underway, but there is no question that these will be in the direction of more equal income distribution.

Complementary Benefits

The project will also have effects in other sectors of the economy and other GOP and USAID projects. In the first instance, one of the long-run economic benefits of such a program is that it will lead to a strengthened general health delivery system. Secondly, since resistance to other diseases and the general state of an individual's health are sharply reduced by a major illness, will also indirectly, but significantly, reduce the incidence of other diseases, the program will make a significant indirect contribution to food production. These results are such that the economic gains in one year will be repeated during each successive year with a cumulative effect as protection against malaria continues and the prophylactic benefits continue to multiply.

The economic value of a reduction in the incidence of the disease, as a result of protection against malaria, is partly related to the distribution of the population. A reduction in incidence among children, who are not economically productive, would have little short-run economic value. However, the long-run value could be much greater. A reduction in incidence might result in increased learning capacity in children such that they would be able to take better

advantage of educational opportunities. In other words, healthy children make better use of an education system than unhealthy ones.

Conclusion

The overall project and therefore the proposed loan (balance of payments considerations are examined in Section VII) are clearly justified on economic grounds. The benefit cost ratios and the internal rate of return clearly exceed the minimum and at least equal those of any existing alternative proposal. Because there are few, if any, additional investments required to gain these benefits, and the project is a response to an immediate problem that threatens to negate the gains from existing investments, it has a uniquely high rate of economic return. To place this in perspective, the estimated benefits from this project in 1978/ '9, of 2,464 million rupees are between 2.5% and 3.0% of the country's expected Gross Domestic Product (100,000 million rupees). Thus, the answer to the question - how much will be saved if 23 million cases of malaria (over a third of the population) can be avoided in that year -- is substantial (Rs. 2.46 billion or \$246 million) though conservatively arrived at.

V. AREAS OF TECHNICAL AND MANAGEMENT CONCERN

There are several areas in which AID has concerns regarding the effective execution of the program. These concerns, listed below, have received special consideration in the development of the terms and conditions of the loan and the monitoring system of the program.

- A. Concern: Reliability of Data. Successful implementation of a malaria control program depends on reliable information on which to base the annual plans of operations. Such information includes epidemiological data on the incidence of the disease and entomological data on the susceptibility of mosquitos to insecticides. We are concerned that case detection procedures, laboratory services and entomological testing may have deteriorated since 1967 to such an extent that the effectiveness of the program may be impaired.

Discussion: GOP officials are aware of their recent poor performance in the collection and interpretation of blood slides and share some of our concern about the accuracy of tests to determine the susceptibility of vectors to various insecticides. They intend to enhance technical supervision and to begin corrective training at METC in Lahore. As a condition precedent in the loan agreement, we are requiring the GOP to request five advisors from WHO, one of whom will be a training advisor assigned full time to METC.

WHO has recently revised its criteria for susceptibility testing of mosquitos using a standard WHO testing kit. These kits are now available in sufficient quantities in Pakistan and WHO field advisors are supervising their use. Instructions have been issued to each Province for the proper conduct of susceptibility tests in the various zones. Two villages will be selected according to established criteria in each sector. The epidemiological data collected from these villages can then be correlated with the results of susceptibility tests and the efficacy of the insecticides applied can be ascertained. The data thus collected will be used to modify, if necessary, the first year's spraying program and to develop more effectively the subsequent annual plans of operation.

USAID believes that recruitment, training and improved employee morale can bring these two technical areas back to the level of 1961-66, which were considered the "good years". Improvement in epidemiological and entomological techniques will be closely monitored at monthly, quarterly, semi-annual internal review meetings and at the annual external review meetings, through

observation, reports, analysis of data collected, and monitoring of field actions and corrective training at the METC.

- B. Concern: Urban Malaria. Urban malaria, especially in Karachi, is a continuing problem which, without adequate financing and control, will threaten the success of the program. The municipalities, corporations and local bodies that serve urban centers, which at present comprise 26 percent of the population, are practically outside the sphere of influence of the Provincial and Federal Health Services. Even if funds for antimalaria activities are available, these urban centers lack the public health expertise to adequately administer such programs.

Discussion: The financial aspect of the urban malaria problem was reviewed at the GOP's Central Development Working Party (CDWP) meeting on August 20, 1974. The CDWP decided that the total rupee cost of the project should be increased by 10 to 15 percent, from Provincial resources, to cover the cost of urban malaria control programs. The overall coordination and technical control of all urban projects will come under the direction of the DOM. In addition the loan provides funds for the GOP to engage the services of an urban vector control specialist for three years to advise the Karachi and other urban malaria control projects.

Concern: High Costs vs. Alternative Strategies. The high cost of this program has led to questions whether less expensive alternative approaches could not yield more efficient results from a cost-benefits standpoint.

Discussion: The most efficient and effective methods of carrying out the control program will be a primary concern at the monthly, quarterly and semi-annual internal review meetings and the annual external review meetings of the GOP, AID and WHO. This constant and continuous evaluation process should enable project management to improve the cost-effectiveness of the malaria control program.

The RPO defines methods of attack in specific areas on the basis of existing information on the malarigenous potential of the areas. With improved epidemiological data and mosquito susceptibility tests, DOM will further delineate and define the malarigenous ratings of these areas. Susceptibility testing will be a continuous operation particularly to DDT, the cheapest and most long-lasting insecticide, since the gene of DDT resistance is recessive and if no DDT is applied to an area of for two or three years, vector susceptibility to DDT may appear again. The RPO calls for the introduction of alternate vector reduction methods such as

biological controls and larviciding where feasible. The RPO also calls for research activities on alternative approaches to malaria control.

All the experts who have examined the present situation in Pakistan generally agree that the approach proposed in the RPO is the only viable and reasonable method, given the present wide-scale epidemic situation. The U. S. malaria assessment team has indicated that if full coverage as described in the RPO is carried out, it will succeed in breaking the back of the existing epidemic and in reducing malaria to a manageable level within three years.

As the epidemic comes under control and research programs here and abroad point the way to other viable and less expensive alternatives, these approaches will be systematically tried and applied in Pakistan.

- D. Concern: Vehicle and Equipment Maintenance. With a large fleet of vehicles located in the four provinces each with separate maintenance facilities, adequate vehicle maintenance will be a serious problem. With the exception of the excellent Punjab vehicle maintenance facility, vehicle repair establishments are rudimentary. Maintenance of other equipment, as well, will require improvement.

Discussion: The U.S. loan provides funds for the GOP to engage a full-time vehicle maintenance advisor for three years to help bring about a major improvement in vehicle maintenance facilities for the malaria control fleet in all provinces. The WHO is planning to send three Pakistani technicians to Switzerland for training in the repair of microscopes. The repair of sprayers is well in hand and only needs an adequate supply of spare parts programmed through this loan and GOP's foreign exchange.

- E. Concern: Integration of Malaria Program into the Regular Health Services: Integration of malaria workers into the regular health services is a requirement if malaria control is to be maintained in the long run. On the other hand, early action to integrate malaria personnel and activities into general health programs, before financial implications, the training needs, and the administrative and logistical support requirements are fully assessed would be disruptive to malaria control efforts.

Discussion: Ministry of Health officials have stated that the integration of the malaria workers is administrative in the first instance. The malaria workers have been made permanent employees of Provincial Health Departments and provided with the normal terms of government employment. They have further

stated that as long as malaria remains a threat, the primary concern of these workers will be the control of malaria. As malaria wanes, the 6,000 plus workers will become the backbone of Provincial communicable disease control efforts in the field, with responsibility for the control of malaria and other important communicable diseases.

In the conditions precedent of the loan, we are requesting periodic progress reports on the integration process as well as assurances that the pace of integration in no way conflicts with malaria control efforts. These conditions, coupled with the assignment of a technical expert on health services, should suffice to see the project through to successful completion and insure functional integration into the regular health services in an orderly manner.

VI. LOAN ADMINISTRATION

A. Conditions Precedent and special Covenants and Warranties

In addition to the standard conditions precedent and covenants the following set of program specific conditions precedent and covenants and warranties will apply to the loan:

1. Conditions Precedent to Disbursement for the 1975 Malaria Control Program. Prior to disbursement of the Loan or to the issuance of Letters of Commitment for that portion of the Malaria Control Program to be executed during calendar year 1975, the Borrower shall, except as A. I. D. may otherwise agree in writing, furnish to A. I. D. in form and substance satisfactory to A. I. D. :

(a) Evidence that all necessary legal action has been taken to create the Directorate of Malaria ("DOM") in the Ministry of Health and Social Welfare ("Ministry of Health") and that DOM is fully operational,

(b) Evidence that the Borrower shall provide to DOM and the Provincial Governments, and the Provincial Governments shall provide to their own health departments, all necessary funds in addition to the Loan for the timely and effective carrying out of that portion of the Malaria Control Program to be executed during 1975;

(c) Evidence of arrangements for the procurement of necessary commodities including, but not limited to, those commodities to be financed under the Loan, including list and prices of such commodities, and the distribution and utilization thereof as required for the Program together with schedules for purchase, delivery, distribution and utilization thereof;

(d) A complete statement of procedures for monthly, quarterly and semi-annual reviews of the Malaria Control Program to be conducted, such procedures including the subjects to be regularly covered at each review meeting;

(e) Evidence that in response to the Borrower's request, W. H. O. has agreed to provide the assistance of technical experts in fields such as malariology, epidemiology, malaria program operations, laboratory administration and training;

(f) An implementation plan which establishes effective procedures for:

- 1) Selection, assignment and contracting of technical advisors and intermediaries;
- 2) The determination of research priorities; and

3) Training of malaria program personnel in Pakistan and overseas institutions; and

(g) Evidence that Plans of Action for 1975 for all provinces have been adopted which are acceptable to W.H.O. and A.I.D.

2. Conditions Precedent to Disbursement for the 1976 Malaria Control Program. Prior to disbursement of the Loan or to the issuance of Letters of Commitment for that portion of the Malaria Control Program to be executed during calendar year 1976, the Borrower shall, except as A.I.D. may otherwise agree in writing, furnish to A.I.D. in form and substance satisfactory to A.I.D.:

(a) Evidence that the Borrower shall provide to DOM and the Provincial Governments, and the Provincial Governments shall provide to their own health departments, all necessary funds in addition to the Loan for the timely and effective carrying out of that portion of the Malaria Control Program to be executed during 1976;

(b) Evidence of arrangements for the procurement of necessary commodities, including but not limited to, those commodities to be financed under the Loan, including list and prices of such commodities, and the distribution and utilization thereof as required for the Program together with schedules for purchase, delivery, distribution and utilization thereof;

(c) Evidence that Plans of Action for 1976 for all provinces have been adopted which are acceptable to W.H.O. and A.I.D.;

(d) A comprehensive plan, including details on time-phasing, for the effective surveillance and control of malaria in urban areas, indicating how the plan will be financed and implemented and which organization(s) will be responsible for its execution;

(e) A comprehensive plan, including details on time-phasing for the transfer to, and effective implementation by, local Health Services of responsibility for maintenance of malaria control efforts after malaria has ceased to be a significant health problem;

(f) A comprehensive plan assuring that an effective control, repair and maintenance system will be established for vehicles procured for the Malaria Control Program which, among other things, shall assure that the following objectives are achieved:

(i) Not more than 10% of vehicles procured during the Program shall be inoperable at any one time;

(ii) Not less than Rs _____ * _____ per year per automobile and Rs. _____ * _____ per year per motorcycle shall be

*Amounts to be determined before loan agreement is signed.

provided for POL and maintenance;

(iii) For each vehicle procured during the Program, not less than 10% of the vehicle cost shall be spent in the purchase of spare parts as recommended by the manufacturer.

(g) Evidence that sprayers and microscopes procured for the Malaria Control Program are being properly maintained so that an adequate supply is available for operational use at all times during the life of the Program.

(h) Evidence that the Borrower has established protocols and a time-phased program for carrying out the research activities required under the loan;

(i) A comprehensive plan, including details on time-phasing, under which specific training plans will be devised for each of several manpower and training areas e.g. curriculum development, personnel selection criteria, training materials and training evaluation.

(j) A time-phased work plan for health education/information activities to be carried out under the terms of the loan.

(k) Evidence that commodities procured for the 1975 portion of the Malaria Control Program have been effectively utilized for the Program;

(l) Evidence that satisfactory progress as determined by the semi-annual reviews is being made with respect to:

(i) the Plan of Operation and annual plans of action;

(ii) the schedules for integration of malaria personnel into the health service of each province; and

(iii) a field review of the on-going program to determine the level of program efficiency, impact on malaria, laboratory improvement, training and research activities, and control of urban malaria.

(m) Evidence that the three technical advisors financed under the term of the loan have entered into service in Pakistan, i.e., specialists in the areas of (1) urban vector control, (2) vehicle transport and maintenance and (3) public health administration.

3. Conditions Precedent to Disbursement for the 1977 Malaria Control Program. Prior to disbursement of the Loan or to the issuance of Letters of Commitment for that portion of the Malaria Control Program to be executed during calendar year 1977, the Borrower shall,

except as A. I. D. may otherwise agree in writing, furnish to A. I. D. in form and substance satisfactory to A. I. D.:

(a) Evidence that the Borrower shall provide to DOM and the Provincial Governments, and the Provincial Governments shall provide to their own health departments, all necessary funds in addition to the Loan for the timely and effective carrying out of that portion of the Malaria Control Program to be executed during 1977;

(b) Evidence of arrangements for the procurement of necessary commodities, including but not limited to, those commodities to be financed under the Loan, including list and prices of such commodities, and the distribution and utilization thereof as required for the Project together with schedules for purchase, delivery, distribution and utilization thereof;

(c) Evidence that Plans of Action for 1977 for all provinces have been adopted which are acceptable to W. H. O. and A. I. D.:

(d) Evidence that commodities procured for the 1976 portion of the Malaria Control Program have been effectively utilized for the Program;

(e) Evidence that satisfactory progress as determined by the semi-annual reviews is being made with respect to:

(i) the Plan of Operation and annual plans of action;

(ii) the schedules for integration of malaria personnel into the health service of each province;

(iii) a field review of the on-going program to determine the level of efficiency of spraying and surveillance operations and the program's impact on malaria and to assess the status of training and research activities, and control of urban malaria; and

(iv) equipment maintenance and repair; and

(f) Such other evidence or documents as A. I. D. may reasonably require.

4. Special Covenants and Warranties

(a) The Pakistan Malaria Control Program. The Borrower shall carry out the Malaria Control Program with sufficient manpower and funding so that both urban and rural malaria will be effectively controlled in Pakistan. Upon attainment of this objective, the Borrower shall maintain continuing and effective urban and rural malaria control

in Pakistan with sufficient resources to assure that achievements accomplished by the malaria organizations are sustained within the framework of its health service.

(b) Annual Plans of Action. The Borrower agrees to implement the Plan of Operations through annual plans of action prepared by each province with the review and approval of the Ministry of Health, W.H.O. and A.I.D. The Ministry of Health shall have authority to amend, modify or alter annual plans of action with the approval of W.H.O. and A.I.D. The Ministry of Health will undertake to ensure uniformity of operations in each province under the Pakistan Malaria Control Program.

(c) Spray Operations. The Borrower shall carry out insecticide spray operations with sufficient resources so that within the next five years malaria is reduced to a level where it is no longer a significant health problem. The Borrower shall carry out sufficient total, focal, and selective spraying coverage in areas of malariogenic potential so that the program's objective is achieved.

(d) Surveillance Operations. It is understood that malaria surveillance operations provide the necessary epidemiological information for proper program planning and evaluation and are central to the effective administration of the Malaria Control Program. The Borrower agrees to take necessary actions to assure the effective and successful completion of malaria surveillance operations during the life of the Project.

(e) Research Activities. It is understood that a program in basic and applied research connected with the field of malaria is essential to provide necessary epidemiological knowledge on malaria. Studies shall include such topics as insecticide susceptibility, vector investigation in problem areas, role of secondary malaria vectors, use of immunofluorescence assessment techniques and the impact of malaria on economic development. The Borrower shall assure that such research activities are carried out effectively.

(f) Training. In order to provide necessary training for Malaria Control Program staff, the Borrower agrees to provide adequate funds for in-service and refresher training as well as for training opportunities for new personnel.

The Malaria Eradication Training Center in Lahore shall continue the pre-service training of supervisory staff at both the professional and sub-professional levels through the organization of regular courses suitably oriented towards the revised strategy of malaria control in Pakistan. The Borrower shall also assure the public health personnel are trained in malaria activities and theory and the malaria workers are given suitable training in public health.

(g) Health Education. The Borrower shall assure that efforts are undertaken in the field of health education to involve the general public in the Malaria Control Program and to obtain their cooperation in carrying out the necessary spraying and surveillance activities. Health education will be particularly aimed at schools, village councils, social/community organizations as well as key village and government bodies in the community.

(h) Urban Malaria. The Borrower recognizes that the control of urban malaria is critical to the success of the nationwide Malaria Control Program. In this connection, the Borrower will assure that anti-malaria and anti-mosquito measures in urban areas are carried out by local government bodies and that financial and manpower needs are met by federal, provincial and local resources.

(i) Integration of Malaria Service into the Basic Health Service. It is understood that the orderly functional integration of the malaria control activity into the basic health service of Pakistan is an important objective of the Program and the Plan of Operations. The Borrower agrees that malaria control units throughout Pakistan should be integrated into the general health services as soon as malaria has been effectively controlled. The Borrower agrees that established health services should assume responsibility for maintenance of malaria control efforts after malaria has ceased to be a significant problem.

(j) Equipment Maintenance. In order to assist in the achievement of the objectives of the Program, the Borrower shall assure that an effective control, repair and maintenance system for vehicles, equipment and other supplies is instituted and carried out.

(k) Personal Service Contractors. Except as A. I. D. may otherwise agree in writing, the Borrower shall employ three personal service contractors utilizing Loan funds for such technical areas as: (1) urban vector control; (2) vehicle transport and maintenance; and (3) public health administration.

(l) Review Meetings. The Borrower shall cause to be held monthly, quarterly and semi-annual review meetings, attended by representatives of organizations in Pakistan responsible for carrying out the Malaria Control Program and by representatives of W. H. O. and A. I. D. The purpose of the review meetings shall be to examine and assess progress in achieving the objectives of the Malaria Control Program and the Project. Plans of activities under the Program and Project shall be reviewed at the meetings and agreed upon by the representatives of the Borrower, W. H. O. and A. I. D. The monthly meetings shall be held in Islamabad, Pakistan to examine administrative and technical details of the Program and Project. The quarterly review meetings, held in

Islamabad or other cities of Pakistan, shall also review Program and Project administrative and technical details, particularly as they affect the activities of the provincial governments. Responsible provincial officials shall participate in the quarterly meetings. Semi-annual review meetings shall be held in December and June of each year of the Program. At the December meeting, technical and managerial progress toward the Program's goal for the year shall be evaluated and the annual plans of action for the next year shall be reviewed and recommendations formulated. At the June meeting, conformity with the provisions of this Agreement shall be reviewed.

(m) Compliance with Plan of Operations. In carrying out the covenants and warranties the Borrower shall adhere to the Plan of Operations and the annual plan of action for each province with material modifications therein being acceptable to W. H. O. and A. I. D.

B. Procurement Management

Procurement orders for both imported and locally available commodities will be centrally managed by the Directorate of Malaria in Islamabad with a representative in Karachi to handle import arrivals and despatch. Orders will be placed either through the Directorate of Investment Promotion and Supplies in Karachi or the Procurement Liaison Officer of the Pakistan Embassy in Washington. AID will reimburse the GOP for 60% of imported program commodities. Those commodities for which A. I. D. reimburses the GOP must be procured in accordance with A. I. D. regulations unless otherwise agreed to by A. I. D.

Timing of orders, particularly for the 1975 spraying program, will be crucial. It is not clear at this time whether or not the needed insecticides, vehicles and sprayers will be ordered and arrive early enough in 1975 to launch any significant country-wide effort in the summer of 1975. Insecticide and vehicle manufacturers are quoting delivery times of up to nine months. Very careful scheduling of orders in 1975 and subsequent years will necessarily have to be closely watched by the GOP and A. I. D.

C. Implementation Schedule

1. GOP places orders for imported pesticides
for 1975 season. January 1975
2. GOP places orders for locally
available commodities. January 1975
3. GOP places orders for vehicles
and sprayers February 1975

4. Loan Authorization February 1975
5. Loan Agreement Signed. March 1975
6. Rupee Grant Agreement Signed. March 1975
7. Release of first year's tranche of rupees July 1975
8. Arrival of imported insecticides April-July 1975
9. Arrival of imported vehicles April-July 1975
10. Arrival of imported sprayers. April-July 1975
11. Conditions Precedent met for (AID reimbursement) 1975 program July 1975
12. Conditions Precedent met for 1976 Program August 1975
13. Release of second year's tranche of rupees July 1976
14. GOP places orders for imported commodities for 1976 season June 1975
15. Arrival of imported commodities November 1975 - February 1976
16. Conditions precedent met for 1977 Program June 1976
17. COP places orders for imported commodities for 1977 season June 1976
18. Arrival of imported commodities November 1976 - February 1977
9. Release of third year's tranche of rupees July 1977

D. AID MONITORING AND EVALUATION PLAN

The USAID will have as a regular member of the Mission a professional public health advisor highly qualified in malariology, who will be charged primarily with program monitoring and evaluation. This advisor will establish and maintain a continuous liaison between the Mission and all elements of the program.

The revised program itself provides a broadened day-to-day monitoring mechanism which will enlarge its scope of activities to continually examine the administration, logistics, communications, execution, supervision, training, staffing patterns and turnovers, procurement and supply of equipment, and equipment and transport maintenance through periodic, monthly, quarterly and semi-annual intensive in-depth program evaluation reviews. Each Province will prepare an annual plan of action which will be thoroughly reviewed at one of the semi-annual review meetings.

The data gathered from this continuous monitoring will be fed back for action to the appropriate departments in the Federal and Provincial governments either informally or through the evaluation review systems.

On the technical side, malaria surveillance operations are being strengthened. These operations provide the necessary epidemiological information for proper program planning and evaluation.

Since evaluation is an essential element for progress and success in a malaria control program, a series of regular program evaluation meetings, including the following, will be required as part of the loan:

- 1) Monthly internal meetings will be held in Islamabad with participation of the GOP, WHO and USAID. At these meetings all data, both administrative and technical, will be examined and fed back into the system as required for action.
- 2) Quarterly internal meetings will be held with participation of GOP, WHO and U.S. officials supplemented by the Chiefs and other key members of the malaria service in each of the Provinces. Extra attendance at these meetings will vary according to problems.
- 3) Semi-annual review meetings will be held in December and June of each year. The meeting in December will include external participants from the WHO and AID. The composition of this external review team will change as little as possible from year to year for the sake of continuity. This team will evaluate technical and managerial progress made towards the goal during the past year, review the annual plans of actions for the coming year and make recommendations. The semi-

annual meeting in June will be for the purpose of reviewing the Borrower's conformity with loan agreement provisions. On the basis of this review AID will decide whether or not to continue to support the program.

Agenda for the meetings will be jointly developed by GOP, WHO and AID officials. Questions which the evaluation will address shall include the following:

1. Progress toward selected program and plan of action targets, national, provincial and district, urban and rural, and reasons for shortcomings or unsatisfactory performance;
2. Physical operational problems and solutions recommended in such areas as insecticide availability, vehicle and sprayer maintenance;
3. Management problems such as communications, procurement and distribution, jurisdictional disputes, program staffing and personnel problems, reporting, funds availability and utilization;
4. Adequacy of epidemiological activity;
5. Progress on research, surveillance and health education objectives;
6. Training progress toward meeting targets and manpower requirements;
7. Effectiveness of foreign technicians;
8. Progress toward integration of malaria services into the basic health services system.
9. Cultural problems relating to program acceptance by target groups.

There will be a formal follow-up on the actions taken to implement all recommendations made jointly at the evaluation meetings by GOP, AID and WHO. Lack of action on these joint recommendations will be considered by AID in making a decision for release of succeeding loan tranches.

All reports emanating from regularly scheduled evaluation meetings as well as special reports will be transmitted to Washington along with the annual Project Appraisal Report.

VII. PAKISTAN ECONOMIC PERFORMANCE AND REPAYMENT CAPABILITY.

A. General Economic Performance.

During FY 1973-74, Pakistan's economy grew by about 3 per cent. Agriculture, the most important sector, increased its output, with the output of the major agricultural crops increasing despite some of the worst flood damage in Pakistan's history. The industrial sector also did well. Some estimates showed a growth rate in industry as high as 12 per cent, although AID's initial estimates of 1973-74 overall industrial growth were a somewhat lower 7 per cent. Almost all of the increase in the manufacturing sector's output in the last two years resulted from better utilization of capacity as new investment lagged. A major factor in the low level of new industrial investment was the uncertainty of private investors about their future role in Pakistan.

The most serious domestic economic problem is inflation. Pakistan's economy was already suffering from severe inflationary pressures before the floods in August 1973. The wholesale price index had increased by 24 per cent during the preceding 12 months. With tax revenues reduced and an unexpected and immediate need for relief and rehabilitation expenditures, inflationary pressure continued to worsen. The wholesale price index increased by 32 percent during calendar year 1973.

The increase in world prices also had its impact upon Pakistan's internal price structure. The petroleum import bill increased from \$60 million in 1972-73 to \$225 million in 1973-74, although only a half year's imports of oil were affected by the general surge in energy prices. Oil imports for the year 1974-75 were projected to be \$365 million. Similarly, where the country had to spend only \$40 million for fertilizer the preceding year, it ended up paying \$100 million for this essential import in 1973-74. These facts have had, and will continue to have, a major impact upon domestic prices. During the first half of 1974 inflation slowed somewhat as harvest supplies came onto the market. But there is no real prospect that inflation will slow down.

The economic rationale for this loan is discussed in Section IV, but it is obvious that the advent of over 14 million cases of malaria would have a profound impact upon the performance of Pakistan's economy. Agriculture production in particular would be hard hit.

B. Balance of Payments Considerations.

One part of the justification for this loan, which will supply external resources to help meet the problem malaria poses for Pakistan, is the fact that Pakistan's imports and other payment obligations exceed its current capacity to earn foreign exchange. The result is that in the absence of the assistance proposed here, imports essential to Pakistan's development and to the effort to contain inflation would have to be eliminated. Pakistan's balance

of payments has been placed under severe strain by the sharp increase in world commodity prices. Although the country's exports have grown substantially in recent years, the basis of this export growth continues to be precariously narrow, heavily concentrated on cotton, cotton products and rice. The country's foreign exchange reserves will be equal to less than two months imports at the levels currently projected for FY 1975.

Since the devaluation of May 1972 the GOP has maintained the liberal import policy adopted at that time with the active support of the IMF and the Aid-to-Pakistan Consortium. The still growing inflationary pressures in Pakistan's economy make it more important than ever that there be no retreat from this policy. A restrictive policy for imports would severely handicap the country's development efforts and increase the upward pressure on domestic prices. Happily, the earlier announced import policy for 1974-75 has confirmed that this policy will not be revised.

The combination of efforts to speed flood recovery, restrain inflation, step up development and increase the real incomes of Pakistan's most disadvantaged families, placed a serious strain on the country's balance of payments in FY 1974. In FY 1973 foreign exchange reserves had increased by 64 per cent. In 1974 there were a number of year-end capital transactions in the form of demand deposits made by OPEC countries. These are reflected in the net invisibles figure, together with government foreign exchange transactions not included elsewhere, but there was no improvement in the reserve position equal to the previous year's.

Pakistan's Balance of Payments
(US \$ Millions)

	<u>FY 1973</u> <u>Actuals</u>	<u>FY 1974</u> <u>Preliminary</u>	<u>FY 1975</u> <u>Projected</u>	<u>FY 1976</u> <u>Projected</u>
Exports	766	1,022	1,200	1,409
Imports	390	1,505	1,900	2,050
Trade Balance	-124	483	-700	-641
Net Invisibles	40	51	-120	-110
Debt Service	186	197	255	349
Balance to be Financed	-270	-629	-1,075	-1,100
<hr style="border-top: 1px dashed black;"/>				
Aid Utilization	337	492	760	1,000
IMF	80	53	215	100
Errors & Omissions	7	-17	-	-
Change in Reserves & Short-term Borrow- ings (Negative- Increase)	-154	101	100	-
(Reserve Position) (468)		(367)	(267)	(267)

Source: GOP Ministry of Finance and USAID Estimates.

1. Trade.

The 1972 devaluation coupled with rising international prices helped boost exports from \$560 million in FY 1972 to \$766 million in FY 1973. Imports amounted to \$890 million for FY 1973. Exports in FY 1974 increased further to about \$1,022 million, but imports also rose sharply to \$1,505 million. The increased export earnings were largely due to higher worldwide commodity prices and would have been greater but for a number of export problems with raw cotton and textile

The GOP projects exports and imports for FY 1975 at \$1,200 million and \$2,000 million respectively, leaving a trade deficit of \$800 million. Slightly lower imports (presented in the table) of about \$1,900 million appear more likely. This includes \$370 million for POL, \$120 million for iron and steel, \$76 million for fertilizer, \$300 million for wheat, and \$160 million for edible oils.

In FY 1975-76 a further improved export performance is expected in raw cotton and cotton textiles which account for 40 percent by value of Pakistan's exports. Other exports (rice, small manufactures, fish, etc.) should also continue their long-run upward trend. However, pressure on Pakistan's terms of trade arising from price increases in petroleum products and other major imports will continue to place heavy pressure on Pakistan's balance of payments. This will result in continued large-scale foreign aid requirements if Pakistan is to proceed with its long-run development unhampered.

2. Invisibles

Net invisibles improved in FY 1974 due to two factors: a higher level of short-term borrowing and more and larger home remittances. In FY 1975 net invisibles are expected to decline as worldwide inflation affects payments for travel, shipping and military imports as well as home remittances. A reduction in short-term borrowings is indicated as softer funds are found, principally in the Middle East.

3. Pakistan's Repayment Prospects

Net official debt servicing by Pakistan amounted to about \$186 million in FY 1973 and is estimated to be \$197 million for FY 1974. On June 28, 1974, Pakistan agreed with the Aid-to-Pakistan Consortium upon a package of debt relief and division of the debts contracted by it for the benefit of the former East Pakistan, now Bangladesh, that will reduce its overall FY 1975 debt services obligations to about \$255 million. The debt relief proposals incorporate a total of \$650 million to be received by Pakistan from its creditors in the Consortium over the next three years. In addition, Pakistan agreed to seek comparable debt relief from creditors outside the Consortium.

As noted above, during FY 1974 Pakistan contracted a number of short-term loans. Among other purposes, these were used to finance imports of wheat immediately needed to replace flood losses. If commodity aid financing is not available in adequate amounts, Pakistan may continue to seek short-term

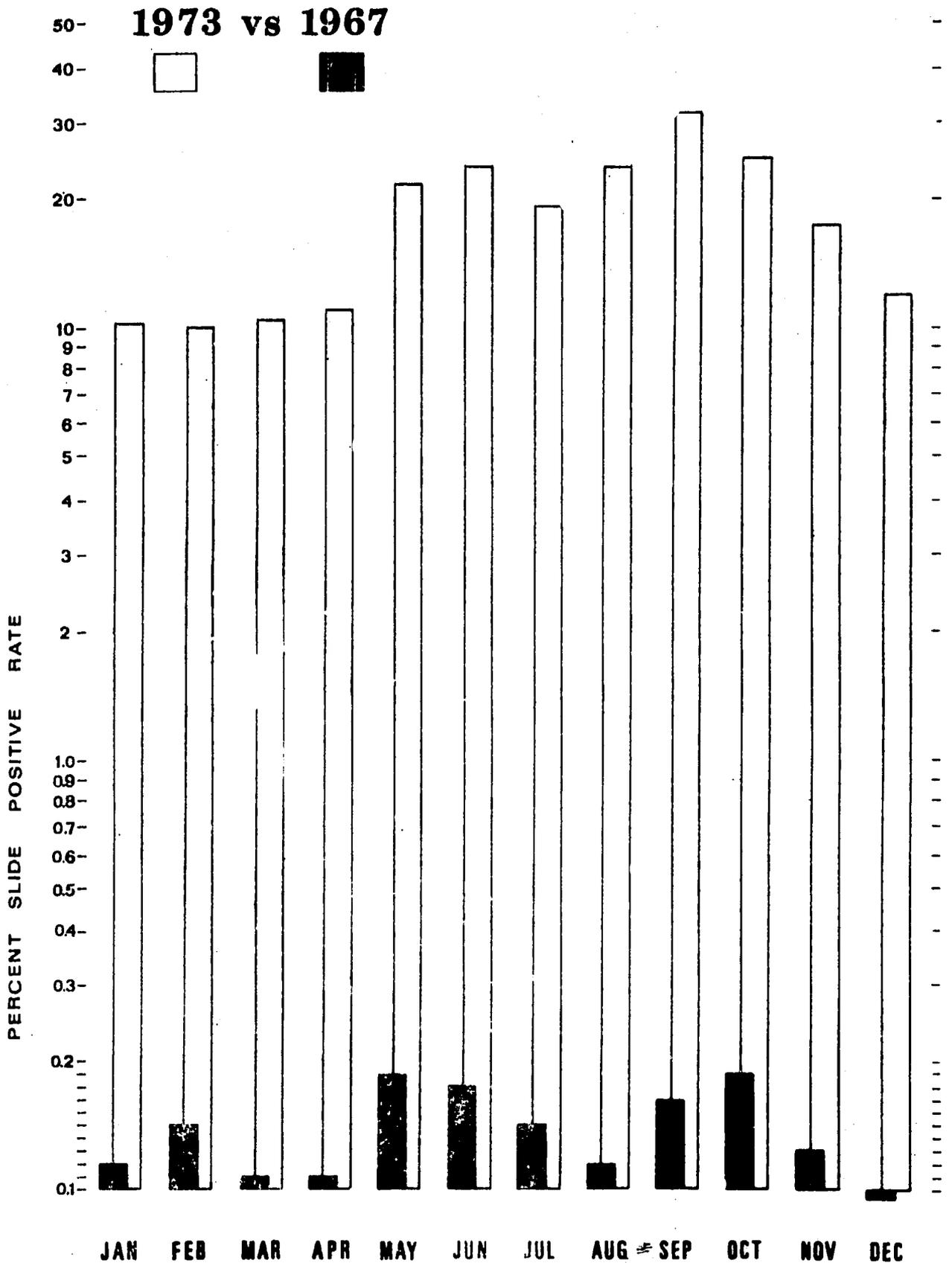
borrowings in FY 1975, including some on even harder terms. While this would improve the short-term balance of payments position, it would be unfortunate in the longer run, and seriously hamper the country's development options.

The combination of debt relief agreed upon and likely future improvement of Pakistan's balance of trade indicate that Pakistan will be able to repay this loan together with the other legitimate debt. During the next few years the economy will have little margin for maneuver but, in the longer run, the situation will improve markedly.

VIII. IMPACT ON U.S. BALANCE OF PAYMENTS

Although the loan will specify Code 941 procurement, it is expected that all of goods and services financed by this loan will come from the U. S.

PAKISTAN INCIDENCE of MALARIA



GOVERNMENT OF PAKISTAN

MINISTRY OF
HEALTH
AND SOCIAL WELFARE

PUBLIC HEALTH
DIVISION

DIRECTORATE OF MALARIA
(DOM)

ASSESSMENT
SECTION

1 Epidemiologist
2 Entomologists
1 Statistician

PUBLIC INFORMATION
SECTION

1 Public Information
Officer

ADMINISTRATIVE
SECTION

1 Administrative/
Supply Officer

ACCOUNTS
SECTION

1 Accountant

NATIONAL MALARIA
ERADICATION TRAINING
CENTER (NMETC)

1 Malariologist
1 Entomologist
1 Superintendent
1 Administrative Officer
Visiting Lecturers

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.

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.

BHC is an abbreviation of the common name Benzene Hexachloride, a chlorinated hydrocarbon type of residual insecticide.

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

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 disease.

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.

Larvacide 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 prevalence 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 organisms causing malaria infections.

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 actively 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.

Radical treatment is the elimination of all infection in an individual through a drug regimen.

Residual insecticide is an insecticide which when suitably applied on a surface, maintains for a considerable time its insecticidal activity by either contact or fumigant action.

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 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.

PAST US ASSISTANCE TO PAKISTAN
MALARIA PROGRAM

<u>DOLLAR PORTION</u>	<u>East Pakistan</u>	<u>West Pakistan</u>	<u>Total</u>
(A) Project Loans: 391-H-053 - FY 63 *	\$ 1,334,631	1,220,217	2,554,848
391-H-084 - FY 65 *	\$ 5,990,576	3,881,819	9,872,395
391-H-128 - FY 68 *	\$ 1,883,372	1,451,593	3,334,965
391-H-135 - FY 68 *	\$ 3,308,713	2,037,612	5,346,325
	=====	=====	=====
	\$ 12,517,292	8,591,241	21,108,533
(B) Commodity Loans: 391-H-046 - FY 63 *	\$ 363,141	1,136,859	1,500,000
391-H-148 - FY 70 *	\$ 637,413	1,878,567	2,515,980
	=====	=====	=====
	\$ 1,000,554	3,015,426	4,015,980
(C) Dollar Grants - FY 63 thru FY 73	\$ 509,198	782,326	1,291,524
	=====	=====	=====
Total A+B+C	\$ 14,027,044	12,388,993	26,416,037
 <u>RUPEE PORTION</u>			
Loans - FY 64 thru FY 70	Rs. 64,016,641	63,100,000	127,116,641
Grants - FY 64 thru FY 70	Rs. 4,400,000	12,000,000	16,400,000
	=====	=====	=====
	Rs. 68,416,641	75,100,000	143,516,641
(Eq. US \$ @ Pak Rs. 4.76 = US \$ 1) **	\$ 14,373,244	15,777,310	30,150,554
Grand Total in US \$:	\$ 28,400,288	28,166,303	56,566,591

* FY of Signing

** Exchange rate at time of rupee loans and grants.

SUMMARY AND CONCLUSIONS
OF THE USAID MALARIA CONSULTANT TEAM - 1974

The Team feels that the proposed Plan of Operations, while requiring further refinement, is, in general, a viable and reasonable plan, given the present wide-spread epidemic situation, and the limited resources available.

The proposed attack, which calls for full spray coverage, (i. e., two applications per year to cover the two transmission peaks in sprayable structures in all endemic areas during the first year, with the areas of low endemicity reverting to focal spraying the second year, those of medium endemicity the third year and those of high endemicity the fourth, is the safest basic plan for stopping the epidemic and bringing malaria rates to a manageable level in a reasonable length of time.

The Team agrees that the urban malaria transmission problem must be attacked concurrently, to avoid leaving foci to re-infect the rest of the country. If well implemented, the Karachi vector control plan should work without resort to aerial ULV spraying, and similar plans should be adopted by other cities, if malaria transmission is proven to occur in them, AID/W can provide a vector control (as opposed to malaria eradication) specialist to consult with the Karachi program and assist with the surveys to determine need for such programs in other cities.

The Team is in full agreement with the need for immediate administrative integration of the MEP with the general health services, provided that operational integration is time-phased so as not to interfere with the immediate requirement of bringing malaria under control. Indeed the Team feels that unless this operational integration has occurred well before the end of the five-year program, so that there are health services in place to find and treat the residual malaria cases as one part of their overall responsibilities, the spray program will have to be continued indefinitely.

With the above in mind, the Team feels that the training program should be strengthened to provide for re-training and cross-training of both MEP and other health workers. Full advantage should be taken of existing training facilities in Pakistan, as well as participant training where indicated.

The epidemiological data gathering system should be improved and strengthened. This should have first priority during the immediate future so as to permit refinement of the high, medium and low malariogenic ratings of areas before the all-out spray operation begins next April. Such a period would advisedly be termed a preparation phase.

Operational testing and pilot studies are indicated in a number of areas. Testing for insecticide resistance should be intensified, and drug-resistance studies initiated where these appear necessary. Pilot studies should be made, in areas chosen to minimize possible risk to large areas, in order to determine the effect of reducing spray application to once a year, and of applying malariogenic ratings to sub-sectors rather than sectors.

An effective research program should be developed to treat such questions as biological, genetic, and engineering methods of vector control, the effect of short-term radical cure drug regimens on relapse rates, etc. Full cooperation should be maintained with the Pakistan Medical Research Center, and full utilization made of the facilities offered by that organization.

The Team feels that the Mission should maintain on its staff a health generalist with overseas field experience in anti-malaria campaigns who would devote his time to advising the National malaria program, assisting in its integration into the general health infrastructure, and monitoring the AID inputs. Another essential is a supply and transport advisor-monitor. Inasmuch as the 25 million dollar AID investment is virtually all commodities, including vehicles, it appears to the Team that such a position would be inexpensive insurance. Also, since the Population Control effort in Pakistan is another area in which the Mission has a substantial investment in commodities and rolling stock, and with which many of the Malaria Program activities will coincide, a single individual might well serve both programs. The Team is in agreement with the composition of the proposed five-man WHO malaria advisory team, but has been informed that WHO cannot provide the logistics expertise, and, from past experience elsewhere, knows that WHO advisory services are not designed to fulfill the continuous technical and administrative monitoring requirements of a USAID Mission.

The Team feels further that annual external evaluations throughout the life of the loan are a necessity, and that, for the sake of continuity, the assessment team's composition should be changed as little as possible from year to year.

ENVIRONMENTAL ASSESSMENT

BACKGROUND

The potential environmental hazards from a malaria control program are limited to the storage, handling and application of chemical insecticides and to effects of the slow biodegradability of some of these insecticides and their consequent ecological magnification in food-chain organisms.

The three insecticides that will be used in the Pakistan Malaria Control Program are DDT, BHC and Malathion. Of these, DDT has been widely criticized and its use limited in the United States to specific agricultural pests and the USPHS certified health emergencies. BHC, although it is an organochlorine compound and shares many of the properties of DDT, is not as persistent as DDT and is considered unlikely to cause problems in the environment. Malathion, an organophosphorus compound, is more biodegradable than DDT and is considered a safe insecticide for mass spraying campaigns if normal precautions are observed.

In 1971 the Director General of the World Health Organization emphasized the continuing importance of DDT in operations against malaria. Excerpts from his report appeared in the WHO Chronicle of May 1971 and portions are quoted below:

"The safety record of DDT for man is remarkable. At the height of its production over 400,000 tons per year were used for agriculture, forestry, public health, and other purposes, all involving some human contact. For typhus control whole populations have had 10% DDT powder blown into their clothing as they wore it. For malaria control, millions of men, women, and children have had the interior walls of their homes sprayed year after year, in some places for more than 20 years. For the control of yellow fever, DDT has been added directly to drinking water. For food protection, many plants and animals eaten by man have been sprayed with this insecticide.

"Yet, in spite of the prolonged exposure of the population of the world and the heavy occupational exposure of a substantial number of people, the only confirmed injurious effects have been from massive accidental or suicidal ingestion.

"Dosage of DDT hundreds of times greater than those encountered by the general population have been tolerated by volunteers for more than a year and by workers for as long as DDT factories have existed, that is, for about a quarter of the human life-span. Over 150 persons

with heavy and prolonged occupational exposure to DDT have been studied exhaustively without any other than the predictable finding, that is, increased storage and excretion of DDT and its metabolites and a mild stimulation of the microsomal enzymes of the liver. The storage of DDT in heavily exposed workers is about 40 times that in the general population, reflecting (because of increased excretion at higher intakes) over 500 times the dosage.

"Those who oppose the use of DDT suggest that it may present a hazard as a carcinogen and a mutagen. The experimental evidence in rodents that DDT, even in massive doses, has such an effect is inconsistent. In the light of the health record of the people most heavily exposed to it, there is no reason to believe that the millions of people protected against vector-borne diseases are at any risk from their small exposure to DDT.

"The presence of DDT in the environment during the past 25 years is believed to have produced two serious effects. The first is the contamination of streams, lakes, and offshore areas and the reduction of the fish population. The second is the progressive extermination of certain predatory birds. But whereas damage to wildlife has sometimes followed the use of DDT in agriculture and forestry, the same risks do not accompany the use of DDT in anti-malaria operations. Since most of the DDT used in the control of malaria is applied as a residual spray indoors, only a small fraction of the insecticide is likely to involve any direct contamination of the environment.

"It has therefore become important to review objectively the issues at stake. Any risks involved in continuing the use of DDT in certain public health programs need to be evaluated as fully as possible, and every opportunity must be taken to reduce unnecessary input of DDT into the environment. In doing this it is necessary to bear in mind that operations against vector-borne diseases, particularly malaria, must be continued by some method that is within the financial and the logistic ability of countries in the tropics."

THE SITUATION IN PAKISTAN

Experience of a quarter century, therefore, has shown that there is little risk to the general population from the use of DDT, the most persistent of the synthetic insecticides in malaria control and eradication programs, and that application of insecticides to the interior surface of houses poses little danger to fish and wild life. Because of increasing resistance of the vector mosquitos to DDT and other chlorinated hydrocarbons, Pakistan will have to depend more and more on other, more expensive but safer, insecticides such as malathion. Thus the small risks

to the population and to fish and wild life associated with DDT in a malaria program should decrease even further.

The segment of the population that is at relatively greater risk in a malaria program are the spray-men, who are subjected to prolonged exposure daily for many consecutive weeks during the spraying season. There is no evidence, however, that this degree of exposure will produce any detectable effects. At the peak of Pakistan's program there will be about 21,000 spray-men, most of whom will be hired locally for each spraying season. Some, but not many, will return for work in subsequent seasons. Thus while their exposure during any one spraying season may be relatively more severe than that of the general population, the overall level of exposure will be low. The risks to the spray-men will also decrease with the use of malathion. While the threshold limit value (amount permissible in the atmosphere) for DDT is 1.0 milligram per cubic meter (mg/m^3), it is 15 mg/m^3 for malathion. Concentrations of malathion observed in work areas are in the range of 0.1 to 0.6 mg/m^3 .

Another method of vector control not normally a part of a malaria control program but recommended in the Plan of Operations for use in urban areas such as Karachi, is the ultra-low-volume (ULV) spraying of malathion into the atmosphere to reduce the numbers of mosquitos. The technique involves the dispersal from special air or ground equipment of fine liquid particles of pesticide concentrates containing 90% or more of active ingredients at application rates of one liter or less per hectare. DOM is aware that the high concentrations of pesticides used in this application demand special care in dealing with spills and leaks from equipment and will set up special training courses for operators to ensure high standards of operation and maintenance. Although people in the community are inevitably exposed to falling particles of pesticide outdoors or sometimes even inside rooms, it has been calculated that this exposure is not significant. The WHO Expert Committee on Insecticides in its Twentieth Report (1973), on the Safe Use of Insecticides, concludes "The Committee considered that insecticides of a toxicity similar to, or less than, that of fenitrothion could be used in such applications, even if repeated regularly at intervals of 2-4 weeks, without exposing applicators or those in the sprayed areas to any toxic hazard from the insecticides". Since malathion is less toxic than fenitrothion, its use in ULV applications is considered safe.

Thus we may conclude that the risks involved from the use of chemical insecticides in the proposed Pakistan Malaria Control Program will be low and will decrease even further with the shift from DDT to malathion.

The Plan of Operations recommends other methods of vector control, particularly for urban areas. Included are three methods of control of the vector in the larval stage: application of oil, or oil and insecticides, to breeding areas; draining and filling of low-lying areas; and the introduction of larvivorous fish such as Gambusia affinis.

The first two methods present few, if any, environmental hazards, in the amounts used for larval control, and should improve the environment by reducing the numbers of nuisance as well as malarial mosquitos.

The introduction of an exotic larvivorous fish such as Gambusia affinis poses no known danger to human beings. It may, however, pose a serious danger to local, native fish, both small and large. Before deciding to bring in a new species, malaria experts from DOM and ichthyologists from the Departments of Fisheries in the Provinces will study the problem and explore first the possibility of finding a small larvivorous native fish that might be effective in controlling mosquito larvae. If none is available, the decision whether or not to introduce Gambusia affinis will be based on all relevant ecological factors, including a consideration whether the net mosquito reduction likely to occur will be sufficient to warrant the risk to existing fish.

ALTERNATIVE STRATEGIES

There have been significant recent developments in the use of biological agents such as nematodes, fungi, protozoa, bacteria, and viruses as alternate methods of insect control. The potential hazards of such methods are not discussed here since it is unlikely that they will be sufficiently tested and approved in time for use in Pakistan during the life of this project.

The reasons for not using mass chemotherapy as a method of control in place of chemical insecticides are discussed in the main part of this paper. Other alternatives on the horizon are immunization and genetic control. Research being conducted at the Pakistan Medical Research Laboratory indicates that it may soon be possible to induce mutations of mosquitos to make them incapable of transmitting the disease. Although it would appear that neither immunization nor genetic control poses any hazards to man, it is not expected that either method will be developed and tested in time to be used extensively in the Pakistan program.

Another alternative, of course, would be to decide to do nothing or to defer action until later, either on economic or environmental grounds. Some of the disastrous consequences of such a decision follow:

1. Millions of Pakistanis will get malaria. If the present epidemic remains unchecked, the entire population would be at risk and the economic and agricultural productivity of the nation would be drastically reduced. The risks to the population and the environment from the use of chemical insecticides are infinitesimal by comparison.

2. The disease may become increasingly difficult and costly to treat. About 10% of the cases in Pakistan now are diagnosed as malignant

malaria, caused by Plasmodium falciparum, in which the severity of the disease and the death rate are much greater than in cases caused by P. vivax. Furthermore, a strain of P. falciparum resistant to chloroquine, the most effective drug for treating the disease, has emerged in Southeast Asia. Cases infected by this resistant strain have appeared in Burma and its introduction into Pakistan in the next few years is not unlikely. If that occurs before malaria control is established, or if there is no control program, the death rate from malaria and the cost of treatment could increase dramatically.

3. If the program is delayed, the cost of achieving malaria control may become prohibitive. Vector mosquitos have already developed resistance to DDT in many parts of the country and may, in a few years, develop resistance to malathion, especially in areas where it has been used as an agricultural pesticide. The substitutes available are limited. Up to 1971 WHO had evaluated no fewer than 1,300 insecticidal compounds for the malaria eradication program - and found only five that are comparable to DDT in effectiveness. Two of these, propoxur and fenetrothion, may prove to be effective replacements for DDT, BHC and Malathion; but the cost (\$4,000 per ton) will be quite prohibitive when used on a large scale in extensive malarious areas.

4. None of the promising alternative methods of control is ready or feasible for mass application. In the midst of an epidemic with millions of cases, the program in Pakistan cannot wait until they are perfected.

CONCLUSION

The net effect of the proposed Pakistan Malaria Control Program on human health and the environment in the broad sense is positive. Any possible risks are greatly outweighed by the benefits arising from properly controlled use of insecticides in the program

NOTES ON ECONOMIC ANALYSIS

Cost/Benefit Tables

Malaria Case Projection

FY	<u>Expected Cases*</u> (If no program)	<u>Expected Cases**</u> (with program)	<u>Cases Avoided</u>
1974/75	14,400,000	10,000,000	4,400,000
1975/76	16,400,000	7,400,000	9,000,000
1976/77	19,000,000	5,500,000	13,500,000
1977/78	21,000,000	3,300,000	17,700,000
1978/79	<u>23,500,000</u>	<u>1,000,000</u>	<u>22,500,000</u>
Five year total:	95,300,000	27,200,000	67,100,000

Costs of Program

(Millions of dollars)

FY	<u>Foreign Exchange Component</u>	<u>Local Currency</u>	<u>Total</u>
1974/75	\$13.90	\$8.34	\$22.24
1975/76	\$23.74	\$7.60	\$31.34
1976/77	\$20.98	\$6.63	\$27.61
1977/78	\$ 2.93	\$3.98	\$ 6.91
1978/79	<u>\$ 2.83</u>	<u>\$3.92</u>	<u>\$ 6.75</u>
Grand Total:	\$64.38***	\$30.47***	\$94.85***

* The projection of expected cases is based on an assumption that the spread of the disease is the inverse of the decline which occurred during the last active malaria eradication campaign, subject to changes in the size of population at risk.

** Expected cases figures (with program) in this projection are higher than the Plan of Operation reflects (no more than 500 cases per 1,000,000 in 1979 or 36,000 cases in the country). This is due to different system of calculation (See below). This method thus biases the benefits on the conservative side.

*** The figures are slightly different than shown in the financial analysis section. Projected costs have not been increased for general price inflation because the same increase would apply to the valuation of the benefits, leaving the ratio between them unchanged.

Malaria Program Benefits
(Figures in millions)

FY	Cases Avoided	Value of Lost Production due to Days Work Lost.	Value of Lost Production due to debili- tation when on Job.	Value of Treat- ment cost Avoided.	Value of Avoided Morta- lity.	Total Benefits.
		Rs.	Rs.	Rs.	Rs.	Rs.
1974/75	4.4	90.00	300.00	25.00	150.00	565.00
1975/76	9.0	186.00	620.00	23.00	310.00	1,139.00
1976/77	13.5	276.00	920.00	22.00	378.00	1,596.00
1977/78	17.7	360.00	1200.00	21.00	480.00	2,061.00
1978/79	22.5	462.00	1540.00	20.00	442.00	2,464.00
Total:						7,825.00

Explanation of Benefit Table

Number of Cases Avoided

To estimate the number of cases that will be avoided it was necessary first to project how many cases would occur without a program. Then the number of cases that would exist with a program (based on the experience during Pakistan's previous anti malaria campaign) was subtracted. The difference is cases avoided. Since the intensity of spraying will depend upon the malariogenic characteristics of an area not all houses will be sprayed. It is assumed that malaria will decrease as a linear function of the intensity of spraying operations. (A number of different functions were fitted to the data for the earlier 1961 - 1965 program, and linear function gave the best fit.) It is also assumed that the pattern of spraying activities will be as outlined in the Plan of Operations and will be maintained for a period of 4 years or more as necessary. In addition, it is assumed that malaria incidence is the same for all age groups.

Value of Lost Production due to days of work lost was estimated by multiplying the number of cases avoided by the proportion (30% of workers in the total population by the average number of work days lost when malaria is contracted (6). by the average urban wage rate (Rs. 1.25 per hour or Rs. 10 per eight hour day). This calculation assumes that the average wage of the urban worker is the same as the average wage of worker affected by malaria - largely rural workers. This assumption is reasonable because although rural workers are generally paid less per hour, they work longer hours. The peak malaria season in many areas, moreover, coincides with the high labor demand period of summer crop harvesting and winter crop planting. Despite the high overall agricultural worker underemployment throughout the year, labor is at a premium during peak malaria periods.

Value of lost production due to debilitation on job. Malaria is a debilitating disease which keeps disease sufferers from working at full capacity for a period of almost two months. The benefit was computed by multiplying the number of cases avoided by the average hourly wage rate (Rs. 1.25) by four hours (half day) by the working days of two months.

Value of treatment costs avoided is an estimate of the cost of presumptive treatment of malaria by the use of malaria suppressants. In high malariogenic areas, vivax malaria, about 90% of the cases, has to be treated for three days with chloroquine and the dose must be followed by a 15 day dose of primaquine. The cost of this treatment per patient is calculated to be Rs. 1.42 per day. In low and medium malariogenic areas there should be suppressive treatment which includes a weekly single dose of chloroquine for a period of over 2 months. Such treatment is estimated to cost Rs. 0.62.

Value of mortality avoided. Accurate statistics on deaths due to malaria are not available, but a death rate of 5/1,000 in the first and second years, 4/1,000 in the 3rd year and 3/1,000 in the fifth year has been assumed. This compares with estimates of mortality as high as 50/1,000 in Indonesia and 100/1,000 in the Philippines. The more conservative estimate of the number of deaths has been used to avoid more complex calculations, which would require estimates of the number of deaths directly involving the work force, the net rather than the gross value of workers output, the age of the victims, and similar variables. Instead, a rough estimate of the loss of welfare to the society of one death was obtained by calculating in gross value of an average worker's future earnings (Rs. 2, ,400 yearly over 20 years) discounted to present value at 10% per year.

PAKISTAN MALARIA CONTROL PROGRAMVEHICLE SCHEDULE

<u>Type of Vehicle*</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>Total</u>
Wagoneer (#) \$3,700+2,200=5,900 \$		(3) 17,700	(2) 11,800			(5) 29,500
Jeeps-CJ-5 (#) \$5,000	(8) \$ 40,000	(12) 60,000	(2) 10,000			(22) 110,000
Jeeps-CJ-6 (#) \$5,000	(32) \$ 160,000	(4) 20,000	(4) 20,000			(40) 200,000
Stake Pick-Up (#) \$5,000	(56) \$ 280,000		(2) 10,000	(4) 20,000	(3) 15,000	(65) 325,000
Land Rover 109" (#) \$6,000	(17) \$102,000	(3) 18,000	(5) 30,000	(6) 36,000	(5) 30,000	(36) 216,000
Land Rover 80" (#) \$5,000	(10) \$ 50,000			(8) 40,000	(6) 30,000	(24) 120,000
Motorcycles (#) \$ 27,000	(45)			(15) 9,000		(60) 36,000
	\$ 659,000	115,700	81,800	105,000	75,000	\$1,036,500
Spare Parts at 10%	\$ 65,900	11,570	8,180	10,500	7,500	103,650
	\$724,900	127,270	89,980	115,500	82,500	1,140,150
5%Contingency	36,245	6,360	4,495	5,775	4,125	57,000
	\$761,145	133,630	94,475	121,275	86,625	\$1,197,150

* Other makes of vehicles may be procured than the ones indicated.

MALARIA CONTROL PROJECT
INSECTICIDE REQUIREMENTS
(In Metric Tons)

Commodity	Year one	Year two	Year three	Total First three years	Year four	Year five	Project Total
Domestic Production							
DDT (75%)	1,971	800	700	3,471	250	150	3,871
BHC (12-1/2%)	1,726	2,484	1,570	5,780	40	4	5,824
Imported							
Malathion (50% wwp)	4,203	9,454	7,766	21,423	916	779	23,118
BHC (26%)	2,813	804	-0-	3,617	-0-	-0-	3,617

ANNEX "K"

SPRAYER REQUIREMENTS

	<u>Number of Sprayers</u>	<u>Cost (\$)</u>	<u>20% Spares (\$)</u>	<u>5% Contingency (\$)</u>	<u>Total (\$)</u>
1975					
Spring	2,500	112,500	22,500	5,625	140,625
Fall	2,500	112,500	22,500	5,625	140,625
1976					
Spring	1,500	67,500	13,500	3,375	84,375
Fall	1,500	67,500	13,500	3,375	84,375
1977					
Spring					
Fall					
1978					
Spring					
Fall					
1979					
Spring					
Fall					
	<u>8,000</u>	<u>360,000</u>	<u>72,000</u>	<u>18,000</u>	<u>450,000</u>

CHECKLIST OF STATUTORY CRITERIABASIC AUTHORITY

1. FAA § 103; § 104; § 105;
§ 106; § 107. Is loan being made
- a. for agriculture, rural development or nutrition; No
- b. for population planning or health Yes, This project will reduce the incidence of malaria through household spraying with insecticides. Presumptive and radical treatment will be available throughout Pakistan where needed.
- c. for education, public administration, or human resources development; No
- d. to solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development; No
- e. in support of the general economy of the recipient country or for development programs conducted by private or international organizations. No

The following abbreviations are used:

FAA - Foreign Assistance Act of 1961, as amended.

FAA, 1973 - Foreign Assistance Act of 1973.

App. - Foreign Assistance and Related Programs Appropriation Act, 1974.

MMA - Merchant Marine Act of 1936, as amended.

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COUNTRY PERFORMANCEProgress Towards Country Goals2. FAA § 201 (b) (5), (7) & (8); § 208

A. Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

(1) Pakistan has long recognized the need to increase food production. On April 30, 1974, Pakistan entered into a major loan for an Agricultural research project. Additionally, Pakistan is, at present, increasing its domestic fertilizer production as evidenced by the Multan expansion project, the projected Fauji plant, and two or three others. Domestic nutrient ton production is forecast to increase from 321,000 to 1,250,000 over the next 4 years. Use of fertilizer increased by 24% in CY 73 alone.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

(2) The nationalization of domestically owned banks and a number of local industries, in fulfillment of certain election pledges of the current government has created uncertainties, and retarded new investment in large scale industry. However, investment in small and medium industry continues, and this year's government budget provides new positive inducements and concessions to private investment. While there may be some further nationalization, Pakistan's leaders have recognized and publicly affirmed that a substantial degree of domestic and foreign private investment is essential to Pakistan's economic development.

(3) Increasing the public's role in the developmental process.

(3) The present government describes itself as a "People's Government."

(3 Contd. .)

During the summer of 1973 a new constitution establishing a parliamentary form of government was put into effect in Pakistan. At the lower level, the fledgling Peoples Works and Integrated Rural Development Programs contemplate more active participation in development at the village level.

(4) (a) Allocating available budgetary resources to development.

(a) Development expenditures are budgeted to increase from Rs. 6113 million in FY 74 to Rs. 8500 million in FY 75, a significant 39% increase. Respective GNP in these years are 60,942 and a forecasted 77,824 million rupees each, so that government expenditures for development purposes will approach 11% of GNP.

(b) Diverting such resources for unnecessary military expenditure (See also Item No. 20) and intervention in affairs of other free and independent nations) (See also Item No. 11)

(b) The budget for defense expenditures in FY 75 has increased by only 18%, less than half the increase in development expenditures, and less even than the wholesale price index. In FY 74 Rs. 4,742 million was spent on defence and the budget now calls for Rs. 5,579 million in FY 75. The recognition of Bangladesh, the Delhi agreement between Pakistan, Bangladesh and India, coupled with the opening of talks to reopen communications with India, all will have a moderating influence on defense spending. At this point in time, it is difficult to judge the effect of India's recent detonation of a nuclear device, or continued strains in Afghan-Pakistan relations on future defense budgets.

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(5) Making economic, social, and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

(6) Willing to contribute funds to the project or program.

(7) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

(5) The Bhutto Government has promulgated a quick succession of land, labor, banking, education, health and law reforms which, if implemented may enable it to achieve development objectives. The rule of law is publicly endorsed. Notwithstanding occasional actions against newspaper editors, press freedoms are greater than under the previous regime.

Section V.B(Financial Analysis) of the loan paper discusses the funding of the project in detail. In addition to its provision of site and existing capital facilities to the project, the GOP will meet over half of the operating and incremental investment costs.

As the responses above suggest, the recipient government has committed itself to meeting the vital economic political and social concerns of its people. Since coming to power, the self-help measures the government has taken include the rupee devaluation of May 1972, and import liberalization program increases in tax revenues and other stabilization measures, steps to increase subsidies on farm inputs and substantial flood relief recovery and rehabilitation efforts. In the last six months it has lifted internal restrictions on the transport and sale of wheat, and increased the government procurement price substantially, measures that will give significant increase incentive to agricultural production.

B. Are above factors taken into account in the furnishing of the subject assistance?

Yes

Treatment of U.S. Citizens and Firms

3. FAA § 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 exhausted available legal remedies and (b) debt is not denied or contested by such government?

No

4. FAA § 620 (e) (1). If assistance is to a government, has it (including government agencies or subdivisions) 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?

The March 1972 Life Insurance Nationalization affected one American Company, which negotiated a satisfactory settlement, and received compensation in 1973. In addition, the nationalization of schools potentially affects one American church organization which owns substantial property in Pakistan. At the present time neither party is pressing the issue.

5. FAA § 620 (o); Fishermen's Protective Act. § 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters,

Not Applicable

a. has any deduction required by Fishermen's Protective Act been made?

Not Applicable

b. has complete denial of assistance been considered by A.I.D. Administrator?

Not Applicable

Relations with U.S. Government and Other Nations

6. FAA § 620 (a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?

Pakistan does not furnish assistance to Cuba. However, during October 1973, 4,000 tons of barley were shipped to Cuba by a private exporter. There had never been any previous barley exports from Pakistan to Cuba. The GOP was unaware of the transaction because there was no procedure for licensing or controlling-----

6. (Contd...)
 shipments of barley. Controls have now been instituted and the GOP has assured the U.S. that no further exports will be made, and we are not aware that any such exports have been made.
- The Secretary of State has determined that Pakistan is not controlled by the international communist movement.
7. FAA § 620 (b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?
8. FAA § 620 (d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20% of the enterprise's annual production during the life of the loan?
9. FAA § 620 (r). Is recipient country a Communist country? No
10. FAA § 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
11. FAA § 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
12. FAA § 620 (l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the A.I.D. administration within the past year considered denying assistance to such government for this reason? Pakistan has instituted the investment guaranty program for the specific risks of expropriation, inconvertibility and war risk.

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13. FAA § 620 (n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam? No
14. FAA § 620 (q). Is the government of the recipient country in default on interest or principal of any A. I. D. loan to the country? No. Pakistan's default under a debt moratorium in May 1971 was relieved by a Debt Rescheduling agreement dated September 20, 1972. A longer term rescheduling has been negotiated by members of the Aid to Pakistan Consortium in Paris, and bilateral discussions of its implementation are now going on.
15. FAA § 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? Diplomatic relations with the United States have not been severed.
16. FAA § 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 A. I. D. Administrator in determining the current A. I. D. Operational Year Budget? Pakistan is not delinquent in any obligations to the United Nations.
17. FAA § 481. Has the government of recipient country failed to take adequate steps to prevent narcotic drugs and other controlled substances (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

18. FAA, 1973 § 29. If (a) military base is located in recipient country and was constructed or is being maintained or operated with funds furnished by U.S., and (b) U.S. personnel carry out military operations from such base, has the President determined that the government of recipient country has authorized regular access to U.S. correspondents to such base
- Not Applicable

Military Expenditures

19. FAA § 620 (s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).
- During fiscal year 1974, Pakistan's known defense expenditures were about Rs. 4742 million, or about 25% of the overall GOP budget. This Fiscal year Rs. 5579 million or about 23% is for defense. The 1974 expenditure was about 6.1% of GNP, and this year is likely to be less. We have no precise estimate of foreign exchange resources utilized to acquire military hardware and other equipment, but believe these are over \$100 million annually, largely to replace obsolescent equipment supplied by the U.S. as military aid during the 1950's and early 1960's. Pakistan has purchased sophisticated weapons systems from abroad including Mirage jet fighters from France, armored personnel carriers from the U.S. and tanks and jet fighters from China.

CONDITIONS OF THE LOAN

General Soundness

20. FAA § 201 (d). Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan.
- The funds will be lent in compliance with the laws of the United States and of Pakistan. The lending terms, 40 years including a 10 year grace period, 2% interest during the grace period and 3% thereafter, are considered reasonable. The rate of interest is less than Pakistan's discount rate.

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21. FAA § 201(b)(2); § 201(e)
Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to A.I.D. an application for such funds together with assurance to indicate that funds will be used in an economically and technically sound manner?
- See Section IV of the loan paper which discuss the project's economic and technical aspects. The Mission is satisfied that the project, as defined in the loan application and GOP Malaria Plan of Operations, is technically and economically sound. Alternative plans and strategies have been considered. A loan application has been received, which contains information assuring that the funds will be used in an economically and technically sound manner.
22. FAA § 201(b) (2). Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment projects.
- (See Section VII of the loan paper). Pakistan's income is continuing to grow and its overall repayment capacity is also growing. This loan will directly contribute to this capacity by increasing the country's productive capacity. The repayment prospects for this loan are excellent.
23. FAA § 201 (b)(1). Information and conclusion on availability of financing from other free-world source, including private sources within the United States.
- The World Health Organization (WHO) plans to contribute approximately upto 25 man years of technical assistance to this project as well as some equipment related to these services.
24. FAA § 611(a)(1). Prior to signing of loan will there be
- (a) engineering, financial, and other plans necessary to carry out the assistance and
- Yes
- (b) a reasonably firm estimate of the cost to the United States of the assistance?
- Yes

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25. FAA § 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 loan?

No legislation is required. However, before the project can proceed, it is necessary that a new legal basis for the Directorate of Malaria (DOM) be promulgated. An executive order to this effect has been approved, and we see no obstacles to its promulgation and ratification. These legal actions will be incorporated in the loan agreement as a condition precedent to disbursement of funds.

26. FAA § 611 (e). If loan is for Capital Assistance, and all U.S. assistance to project now exceeds \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

A certification by the Mission Director is included in this loan paper.

Loan's Relationship to Achievement of Country and Regional Goals

27. FAA § 207: §113
Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, political, and social institutions;
(b) self-help in meeting the country's food needs;
(c) improving availability of trained manpower in the country;
(d) programs designed to meet the country's health needs;
(e) other important areas of economic, political and social development, including industry(continued....)

The primary objective of this project is to decrease the incidence of malaria from a reported 26% to a figure less than 0.5%. In so doing, millions of people will be freed from the debilitating effects of the sickness thus reducing frequent and recurring absence from jobs. Since over half of Pakistan's work force is directly or indirectly employed in the agriculture sector, the reduction of malaria will mostly affect this sector and have a very positive effect on the country's food production. Additionally, as discussed in the loan paper, during the course of the project, integration of the malaria(continued....)

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free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or
(f) integrating women into the recipient country's national economy.

workers into the National Health Services will greatly enhance the ability of the National Health Services to reach and treat more of Pakistan's populace.

28. FAA § 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?
- No, this project is not susceptible of execution as part of a regional project due to the sensitive political relations between Pakistan and its two neighbors, India and Afghanistan. However, in the past, there was a continuing dialogue between the malaria organizations of India and Pakistan concerning plans of operation, and epidemiological data. We would hope this dialogue will be resumed as the program is implemented.
29. FAA § 201(b)(4). Information and conclusion on activity's relationship to, and consistency with other development activities, and its contribution to realizable long-range objectives.
- The health improvement resulting from this project is essential to expanding and broadening both industrial and agriculture production, and improving the real income of Pakistan's low income groups.
30. FAA § 201(b)(9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.
- It is expected that the reduction in malaria will contribute to increased agricultural and industrial production by lowering worker absences.
31. FAA § 209. Information and conclusion whether assistance will encourage regional development programs.
- Although the loan is directed at a disease which is also present in adjoining countries, it is not feasible at this time to try to establish a regional development program, owing to political animosities. The program however, was coordinated with the World Health Organization's world-wide effort to reduce malaria.
32. FAA § Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.
- This loan will improve the health of the rural poor, enabling them to increase their agricultural productivity and their chances for participation in development.

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33. FAA § 201 (f). If this is a project loan, describe how such project will promote the country's economic development taking into account the country's human and material resources requirements and the relationship between ultimate objectives of the project and overall economic development.
- Improved basic health is essential to increased agriculture development for Pakistan.
34. FAA § 281 (a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.
- The loan will contribute to a health program which reaches all segments of the population.
35. FAA § 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 resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.
- The program has been specially designed to meet a problem of epidemic disease in Pakistan by Pakistani experts meeting with others from outside. The program will incorporate research projects now going forward at a number of institutions in Pakistan, and will upgrade the training of health workers, medical personnel and others. Subsequently the entire project will continue without outside assistance.
36. FAA § 201 (b)(3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities ?
- One objective of the activity is to reduce the economic loss of lowered worker productivity and the expense of medical treatment. The manpower and funds thus released will increase productive capacity.
37. FAA § 601 (a). Information and conclusions whether loan 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.
- (a) The loan will have little lasting effect on international trade other than to finance needed imports for the period of the program.
 - (b) No effect on private initiative and competition.
 - (c) No effect on cooperatives, credit unions and savings and loan associations.
 - (d) No effect on monopolistic practices.
 - (e) Will increase technical efficiency of industry, agriculture and

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commerce by reducing time lost when workers are ill.
 (f) No effect on labor unions.

38. FAA § 619. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate ?

Not applicable.

Loan's Effect on U. S. and A. I. D. Program

39. FAA § 201 (b)(6). Information and conclusion on possible effects of loan on U. S. economy, with special reference to areas of substantial labor surplus, and extent to which U. S. commodities and assistance are furnished in a manner consistent with improving the U. S. balance of payments position.

The loan will be administered in line with existing U. S. G. regulations. Therefore a major portion of the loan will be disbursed in the U. S.

40. FAA § 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.

One hundred percent of the loan proceeds will be used by the public sector, in the Directorate of Malaria (DOM) and ninety eight percent of the funds will be used to purchase commodities from private sector suppliers.

41. FAA § 601(b). Information and conclusion on how the loan 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).

This loan is not expected to directly foster U. S. investment abroad.

42. FAA § 601(d). If a capital project, are engineering and professional services of U. S. firms and their affiliates used to the maximum extent consistent with the national interest ?

Nine man years of loan financed technical assistance is expected to be of U. S. origin.

43. FAA § 601. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the loan. A large portion of the proceeds of the loan will finance the insecticide malathion, which is produced by only one firm in the United States. Other commodities, pesticide sprayers and vehicles will come from large U.S. firms who will procure parts and components from smaller U.S. firms.
44. FAA § 620 (h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Block countries? No.
45. FAA § 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs. Technical assistance will be financed by the loan. The services will be secured from private enterprise or government sources, on the basis of best qualifications. If the services are obtained from Federal agencies, it will be because they are readily available or because suitably qualified personnel in the private sector can not be located.
- Loan's Compliance with Specific Requirements
46. FAA § 110 (a); § 208(e). In what manner has or will the recipient country provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the Loan is to be made? The Government of Pakistan will provide such assurance by signing a loan agreement with a provision contained therein that it will provide at least 25% of the cost of the activity.
47. FAA § 112. Will loan be used to finance police training or related program in recipient country? No.
48. FAA § 111. Will loan be used to pay for performance of abortions or to motivate or coerce persons to practice abortions? No.
49. FAA § 201 (b). Is the country among the 20 countries in which development loan funds may be used to make loans in the fiscal year? Yes.

50. FAA § 201(d). Is interest rate of loan at least 2% per annum during grace period and at least 3% per annum thereafter? **Yes.**
51. FAA § 201(f). If this is a project loan what provisions have been made for appropriate participation by the recipient country's private enterprise? **The loan is being implemented by an agency of the Government of Pakistan which is appropriate for a public health project.**
52. FAA § 604 (a). Will all commodity procurement financed under the loan be from the United States except as otherwise determined by the President? **Yes.**
53. FAA § 604 (b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price? **The loan agreement will preclude such financing.**
54. FAA § 604 (d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the loan? **Yes, an appropriate provision will be included in the loan agreement.**
55. FAA § 604 (e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? **Not Applicable.**
56. FAA § 604 (f). If loan finances a commodity import program, will arrangements be made for supplier certification to A. I. D. and A. I. D. approval of commodity as eligible and suitable? **Not applicable, this is a project loan.**
57. FAA § 608 (a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. **The major portion of the loan will finance malathion pesticide, which is not available as excess property. Vehicles and sprayers may be obtainable in part from excess property stocks. A provision to encourage the use of these stocks will be included in the loan agreement.**

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58. FAA § 611 (b); App. § 101. If loan finances water or water-related land resource construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962? **Not Applicable.**
59. FAA § 611 (c). If contracts for construction are to be financed, what provision will be made that they be let on a competitive basis to maximum extent practicable? **Not Applicable.**
60. FAA § 612 (b); § 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. **A grant from excess U.S. owned rupees (Mondale) in the amount of Rs. 250 million will be made to the GOP to help meet the local currency costs of the project. The balance of the local currency requirement will be provided by the GOP.**
61. App. § 113. Will any of loan funds be used to acquire currency of recipient country from non-U.S. Treasury sources when excess currency of that country is on deposit in U.S. Treasury? **No**
62. FAA § 612 (d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release? **The U.S. owns excess Pakistani rupees. Part of the costs of the program financed by this loan will be met by a grant of \$25 million of this loan, with disbursement over several years.**
63. FAA § 620 (g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property? **Loan proceeds disbursement procedures as will be included in the loan agreement will prevent use of the funds for purposes other than intended.**
64. FAA § 620 (k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed \$100 million? **Not Applicable.**

65. FAA § 636 (i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction? No
66. App. § 103. Will any loan funds be used to pay pensions, etc., for military personnel? No.
67. App. § 105. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms? Such a provision will be included in the loan agreement.
68. App. § 107. Will any loan funds be used to pay UN assessments? No.
69. App. § 108. Compliance with regulations on employment of U.S. and local personnel. (A.I.D. Regulation 7). Not Applicable.
70. App. § 110. Will any of loan funds be used to carry out provisions of FAA § 209 (d)? No.
71. App. § 114. Describe how the Committee on Appropriations of the Senate and House have been or will be notified concerning the activity, program, project, country, or other operation to be financed by the Loan. Notification of the proposed assistance was contained in AID's FY 75 Congressional Presentation.
72. App. § 601. Will any loan funds be used for publicity or propaganda purposes within the United States not authorized by Congress? No.
73. MMA § 901. b; FAA § 640 C.
- (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk Provisions will be included in the Loan Agreement for complying with this Section.

(73 Contd...)

carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S. - Flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.

(b) Will grant be made to loan recipient to pay all or any portion of such differential as may exist between U.S. and foreign-flag vessel rates? **No.**

74. Section 30 and 31 of PL 93-189 (FAA of 1973). **No.**

Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South Vietnam or Thailand?

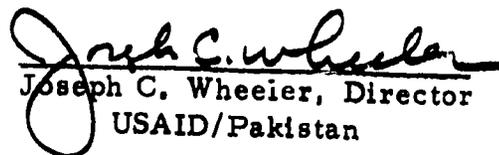
75. Section 37 of PL 93-189 (FAA of 1973); App. § 111. Will any part of this loan be used to aid or assist generally or in the reconstruction of North Vietnam? **No.**

76. App. § 112. Will any of the funds appropriated or local currencies generated as a result of AID assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese? **No.**

77. App. § 604. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to Southeast Asia for use by non-U.S. nationals? **No.**

PAKISTAN - MALARIA CONTROL
CERTIFICATION PURSUANT TO SECTION 611(e) OF
THE FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Joseph C. Wheeler, principal officer of the Agency for International Development in Pakistan, having taken into account among other things the maintenance and utilization of projects in Pakistan previously financed or assisted by the U.S. and the commitment of the Government of Pakistan to carry out an effective malaria control program, do hereby certify that in my judgment Pakistan has the financial and human resources capability to implement, maintain and utilize effectively the subject capital assistance project for malaria control.


Joseph C. Wheeler, Director
USAID/Pakistan

February 7, 1975
Date

DRAFT

ANNEX "N"

Loan No. 391-

LOAN AUTHORIZATION

Provided From: FAA Sec. 104 ("Population Planning and Health"
(Pakistan: Malaria Control)

Pursuant to the authority vested in the Administrator, Agency for International Development ("A.I.D."), by the Foreign Assistance Act of 1961, as amended, and the delegation of authority issued thereunder, I hereby authorize the establishment of a loan ("The Loan") pursuant to Part I, Chapter 1., Section 104 and Part I, Chapter 2., Title I, the Development Loan Fund, of said Act, to the Government of Pakistan ("Borrower") of not to exceed thirty-five million United States dollars (\$35,000,000) to assist in financing the foreign exchange costs of goods and services required to support a multi-year program of malaria control in Pakistan. The Loan is subject to the following terms and conditions:

1. Interest Rate and Terms of Payment: Borrower shall repay the Loan to A.I.D. in United States dollars within forty (40) years from the first disbursement under the Loan including a grace period of not to exceed ten (10) years. Borrower shall pay to A.I.D. in United States dollars interest on the outstanding disbursed balance of the Loan and any due and unpaid interest at the rate of two percent (2%) per annum during the grace period and three percent (3%) thereafter.
2. Other Terms and Conditions:
 - (a) Unless A.I.D. otherwise agrees in writing, goods and services financed under the Loan shall have their source and origin in the United States or any country included in A.I.D. Geographic Code 941.
 - (b) The Loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

Administrator

Date