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REPORT OF MALARIA EXTERNAL REVIEW TEAM

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I. Synopsis

The Government of Pakistan has undertaken a 5 year program to bring malaria infections under control. This program entails merging of malaria control methodologies with a developing system of general health services at the local level in each province. While each province has unique malaria problems and plans for the control of malaria, an attempt is being made to coordinate the 5 year program under the Directorate of Malaria Control.

During the past several years it appears that malaria incidence has increased in all areas of Pakistan to an estimated level of 5 million cases in 1975. Due to deficient and understaffed surveillance operations, precise data on the number of malaria case is not available in either urban or rural populations. In all provinces, many of the operational necessities for malaria control such as vehicles, sprayers, field workers, and insecticide are insufficient to launch a comprehensive program. The larger urban areas of Pakistan, in particular Karachi, have serious levels of malaria transmission. Improper sanitation practices and inadequate sewerage systems are the predisposing factors to malaria in the cities. The attempt to control malaria in urban areas in previous years has been pragmatic. Correction of these problems will require coordination among the responsible jurisdictions in the cities as well as participation of technical experts in sanitation, vector control, and water management.

The concept of integration as applied to the merger of malaria control and health services has several implications. Among the basic issues to integration is the demand for permanent status as a part of the health system for malaria workers. This issue should be resolved promptly at the provincial level. In a broader scope, it is recognized that until the general health services develop at the local level, malaria control may be difficult to attain or sustain (refer to Section 5.4).

At present, comprehensive plans for malaria control have been developed by the national malaria program and each province except the Sind. In the Sind, strong efforts must be made to assess the malaria problem and generate a workable plan. All provinces must reevaluate the current status of malaria and its vectors so that the malaria control activities will be effective.

In monitoring the progress of malaria control it is suggested that observations be focused on the subsector. This unit is of sufficient magnitude to document changes in the critical elements of malaria control: (1) surveillance, (2) spraying operations, and (3) integration of general health services.

2. Introduction and Terms of Reference

The joint agreement signed on October 10, 1975 by the Government of Pakistan and USAID stipulated that external review teams should regularly assess the progress that had been made toward the renewal of malaria control activities in Pakistan. Originally the loan agreement was to have been signed in late 1974, and the external review would have been an assessment at the end of the 1st year of operation. Therefore, the external view, 1-21 December, 1975, was requested by the two governments to review the current status of malaria control operations and planning. The team members were:

1. Dr. Ghulam Hashim Mallick NMCP/Pakistan - Epidemiologist
2. Ch. A.A. Mujahid NMCP/Pakistan - Entomologist
3. Dr. Imtiaz Hussain Shah NMTC/Lahore - Malariologist
4. Mr. Rashed Bahar WHO/EMRO - Sanitary Engineer
5. Dr. Carlos Campbell USPHS/CDC - Epidemiologist
6. Mr. Roger G. Grenier USAID - Entomologist
7. Dr. L.A. Simeonov WHO/EMRO - Public Health Advisor.

The objectives of the Malaria Control Program (MCP) in Pakistan were generally stated in the 5-year plan of action dated 22 November, 1974.

(1) To apply a malaria eradication strategy which should conform with WHO revised strategy of the global malaria eradication programme envisaging conformity with the socio-economic conditions including the present health structure of the country and with due consideration to the epidemiological features of malaria in the various areas of Pakistan.

(2) To continue to apply simultaneously anti-malaria measures in all malarious areas of Pakistan with a view to reduce its endemicity progressively until the ultimate goal of malaria eradication is attained.

(3) To strengthen the basic health services through the timely absorption of malaria personnel into the general health services without jeopardizing the effectiveness of the anti-malaria program in reaching its ultimate goal of eradication.

The team interpreted the stated objectives as a control program for malaria. Inherent in the concept of control is the recognition that the newer, non-time-limited methodologies must be devised and rationally implement; specifically the renewed application of malaria eradication

methodologies over a prolonged, undefined time interval would not be feasible. Additionally, the control program was to be administratively and functionally merged with general health services in Pakistan. The team understood that this planned integration was being implemented.

Terms of reference supplied to the external review team were:

(1) begin the evaluation mechanisms for the Malaria Control Program, (2) assess the current malaria situation, (3) determine whether plans for the control of urban malaria and the integration of malaria control into general health services were proceeding satisfactorily (USAID cable # 8858 dated September 4, 1975).

The team focused attention on these specific guidelines. In addition, other issues integrally involved with the plans for malaria control were observed, and comments about such matters will be included when appropriate. Recent excellent documents form both the national malaria program and by international malaria authorities were utilized by the team. Several of these documents will be referred to particularly when they contain more detailed informations than this review group could collect during a 3 week visit.

The observations and suggestions contained in this report are intended as a constructive over view of the immense challenge posed by malaria control in Pakistan.

3. Background of Malaria Eradication Program;

Malaria eradication was initiated in Pakistan in 1961 according to the Plan of Operation prepared in consultation with WHO and USAID. The operation was entrusted to an autonomous organization under the Malaria Eradication Board (MEB) created by the Malaria Eradication Ordinance of 1961.

Malaria eradication measures were implemented progressively by stages to cover all of the country in eleven years. The operation was considered successful upto 1967 when the annual parasite rate fell below 1%. However, technical and administrative problems developed, namely the resistance of the vector(s) in some parts of the country, endemic malaria in urban areas, a premature shift of some zones from the attack to the consolidation phase and a lack of funds. Beginning in 1969, malaria cases increased over the entire country.

All health activities were decentralized in the country during 1970 so that the provincial health departments have since assumed full responsibilities for planning and implementing their health schemes. However, the malaria organization maintained its activities vertically under the

MEB according to the 1961 ordinance. During 1971, at the request of GOP, a review team visited the country to formulate a new strategy for the anti-malaria campaign.

The transition period between 1972 and 1975 was followed by the repeal of the MEB Ordinance and the anti-malaria program was placed under the responsibility of the respective Provincial Health Departments. Between 1973 and 1975, a series of meetings were held at the Federal level to formulate an extended Plan of Operations (Plan Ops) for the anti-malaria program. The extended plan was prepared and approved by a Governor's Conference (Provincial Coordination Committee) in November, 1974. In January 1975, the Plan Ops was accepted by the Executive Committee of National Economic Council (ECNEC). On the basis of this extended Plan of Operations, the GOP and USAID signed a loan agreement on October 10, 1975. Meanwhile, the number of malaria cases reached an epidemic level.

4. Method of Review

The team was divided into 2 groups with equal representation of external and national members. Each group visited 2 provinces during a 10 day period. The itinerary of the 2 groups is detailed in Annex A.

At the malaria provincial, regional and zonal offices visited, the responsible officials presented a short briefing on past and present malaria operations and problems; discussions were held with the responsible technical staff members concerning the technical and operational problems, urban malaria plans, integration, recording and reporting systems, training manuals, vector density studies, susceptibility tests, timing of spraying operations, laboratory procedures and time-lag, and questionaries were completed for surveillance and spraying operations. The technical and administration sections were visited at the three office levels where information and data were obtained concerning staffing, vehicles, spray pumps, G.R. data, insecticides, microscopes, spare parts for vehicles and pumps, etc.. House cards were checked in several houses in the sub-sector localities visited and attempts made to locate Malaria Supervisors to observe their work procedures. Some units such as civil dispensaries and hospitals were also visited. The Punjab and NWFP were the only provinces to provide the team with the required technical briefing data for 1975. Reports and other documents utilized by the team are noted in the bibliography (Annex B).

5. Findings.

5. 1. Surveillance

Under the guidelines of the malaria eradication program conducted in Pakistan, parasitological and entological surveillance activities adhered to the world-wide eradication pattern. All surveillance operations were based on accurate geographical information which permitted "total-coverage" either in insecticides spraying or malaria case detection and treatment.

The primary objective of malaria surveillance was to document when transmission was interrupted. Entomological surveillance was initially developed in order to determine the time and space distribution of the Anopheline vector(s) as a basis for insecticide spraying. With the emergence of DDT resistance, accurate surveillance assumed increased importance.

As the malaria operation adopts the control philosophy, it is important to review the surveillance systems currently in operation, the data which these systems have produced, and finally to consider the surveillance requirements for the 5 year program beginning in 1976.

5. 1. 1. Surveillance Unit.

Each province has been divided into subsectors as the basic unit of surveillance and operations. These subsectors correspond to an approximate population of 12, 500. The most recent updating of the basic geographic and census data in each province is summarized:

	PUNJAB 1974	SIND 1973	NWFP 1975	BALUCHIS-TAN 1974/75	PAKISTAN 1974/75
Zones	19	8	8	2	37
Sub-Zones	-	-	-	3	3
Sectors	140	68	49	40	297
Sub-sectors	2, 044	561	625	212	3, 442
Localities	26, 643	7, 371	5, 659	5, 359	45, 012
Houses	6, 678, 509	1, 425. 298	1, 612, 707	330, 860	10, 047, 374
Rooms	19, 826, 746	4, 310, 233	4, 958, 952	898, 166	29, 994, 097
Population	31, 648, 553	7, 141, 219	7, 810, 845	1, 512, 797	48, 113, 414

Each province except the Sind has attempted to stratify their zones or subsectors according to the malariogenic potential and operational feasibility. Only in Baluchistan have operational decisions been made based upon this stratification; and on close examination only the operational feasibility (i.e. access, weather, etc.) varies demonstrably among the areas.

5.1.2. Surveillance Operations

During 1975 active surveillance for malaria cases has occurred principally through monthly cycles of active case detection (ACD) in the provinces. The ACD was conducted exclusively in rural areas. In the Sind, less than half of established subsectors submitted malaria slides. Lack of transportation and supervision severely limited the surveillance of malaria in Baluchistan. Only in NWFP and the Punjab did adequate geographical ACD coverage exist during the current year. Activated passive case detection (A-PCD) based in health units fuctioned in some remoter area of Baluchistan, in the periphery of Peshawar City (NWFP) and in the Thatta district of the Sind (as will be described).

5.1.3. Malaria Cases, 1975

Province	Population	Slides examined*	P. vivax	P. falciparum
Baluchistan	1,512,797	24,928	120	88
NWFP	7,810,845	512,424	9,256	410
Punjab	31,648,553	1,571,788	75,718	22,718
Sind	7,141,219	12,914	416	67

*Total to August, except in NWFP where September is included.

The blood slide examination rates (BER) in the Sind and Baluchistan are very low and no conclusions concerning the incidence of malaria in these areas are justified. Evidence from the NWFP and the Punjab indicates that malaria rates are increased in 1975; in The Punjab, most zones have reported a higher incidence of P. falciparum cases in 1975 and there has been a dramatic rise in both species of malaria in NWFP during August and September.

5.1.4. Entomological Surveillance, 1975

Recent information concerning vector density by season is lacking in all provinces except for the Punjab. The most recent relating to vector susceptibility are summarized:

Province	No. of zones	Total Tests	DDT				DI.D				Malathion			
			S	T	R	Total	S	T	R	Total	S	T	R	Total
Punjab	19	249	0	22	66	88	35	64	62	161	Vector species were susceptible to all			
NWFP	8	253	2	24	66	92	8	16	63	87	74	0	0	74
SIND	Thatta	16	1	1	10	12	4	0	0	4	No tests.			
Baluch.	Quetta	14	0	0	5	5	3	1	5	9	No tests.			
	29	532	3	47	147	197	50	81	130	261	74	0	0	74

* S=Susceptible T = Tolerant R = Resistant

While these data are not as adequate in the Sind or Baluchistan, they are consistent with previous reports. The history of the development of resistance by the vector species in Pakistan is clearly presented by G.R. Shidrawi, EMRO Entomologist, in his report dated February 1975. The problem of vector resistance to DDT and BHC in Pakistan was also brought to the attention of the program officials in a report by an internal review team during 1971 and which also recommended that Malathion should be used in the spraying operation in DDT and BHC resistant areas. Resistance to both BHC and DDT appear to be uniform.

5.1.5. Surveillance plans for 1976.

The 4 provinces vary noticably in their plan of surveillance operation for 1976. The Punjab and NWFP will retain a vertical malaria reporting system emphasizing ACD rounds throughout most of the year. The primary objective in these areas will be to increase supervision at the subsector level and to establish ACD in those areas currently lacking such reconnoissance. In the NWFP, activated-PCD in urban areas will be established. In Baluchistan those subsectors with low transmission potential will be surveyed twice annually for parasite rate in addition to activated-PCD available through a health post. The more malarious area of Quetta zone will be under ACD coverage.

At present the projected surveillance plan for the Sind, exclusive of Thatta, are not available in sufficient detail to consider their adequacy. It is not clear whether malaria surveillance as a vertical activity will be rejuvenated for an interim period, or whether the centre operation will evolve from 1976 under the general health services.

5.1.6. Summary

The success of a well-integrated malaria control program in Pakistan will depend upon the precision of parasite and vector surveillance. The essence of surveillance in a control operation is basic, accurate reporting from subsector and locality levels of the program. Total coverage by any single control methodology is no longer financillay or logistically realistic. Based upon documented local malaria characteristic the most efficient and economical program for each area can be constructed. It is not essential that provincial surveillance systems be identical. Malaria transmission characteristics vary considerably among zones, and surveillance systems should adopt to local conditions.

Guidelines for malaria surveillance are well presented in the National Plan of Operation. Stress is given to the development of PCD, not only on an activated basis in health posts, but also as a voluntary collaborator basis. Development of PCD in all provinces will be necessary to provide immediate therapy for parasitemias during peak transmission and to increase time coverage in surveillance operations. The following specific details of surveillance should be considered in the coming year.

A. Irrespective of whether malaria operations remain as a vertical operation or are integrated under the General Health Services, a current census must be maintained at the subsector level. This census should permit the calculation of malaria rates and meet the specific operational requirements.

If the stratification of provinces into high, medium, and low malariogenic potential is to be employed, precise definition of each parameter must be given. Otherwise it may be preferable to consider each subsector as an individual unit.

B. Only the Punjab currently has a provincial epidemiologist. If planning for 1976 surveillance activities is to proceed, the vacancies in other 3 provinces must be filled with qualified individuals. Until these planning capability is available in the provinces, the DOM should extend epidemiological assistance.

Under the technical direction of the malaria control program surveillance programs must be developed in all urban areas. PCD with full geographical coverage extending into slum zones is important.

C. Particular attention must be given to surveillance in the Sind. With the MCP dormant for the past 2 years, historical data cannot be trusted for planning. The Thatta system of a public health worker per 10,000 population, when functional, could provide reliable data. If operational decision are made before base line data is collected, much time and money may be lost. Unless the vacant posts in the other subsectors are filled with trained malaria personnel, no adequate surveillance operations or reliable base line data will be possible.

D. The objectives of the malaria control program in Pakistan must be defined with clear epidemiological parameters. Such parameters should be based upon adequate geographical and temporal surveillance for malaria cases and a systematic epidemiological analysis of these data.

5.2. Malaria Control Program

5.2.1. Plans of Action for 1975-76

As required by the Plan of Operation for an Extended Malaria Eradication Program and upon request by the DMC, the four provincial offices submitted separate Plans of Action for 1975/76. The DMC, WHO and USAID approved the plans for the Punjab, Baluchistan and N.W.F. Provinces whereas the plan for the Sind was not acceptable. The team has not been provided with a Plan of Action for Azad Kashmir although the revised Plan of Operation does mention that malaria control work will be started in this area.

5.2.2. Spraying Operations

Emergency spraying operations were carried out to protect the population against the ravages of malaria this past year.

SPRAYING OPERATIONS REPORT FOR THE YEAR 1975 (10)

Province	Existing Houses	Sprayed Houses	Insecticide Type used	Dosage Gm/M	Houses % of spray coverage
Punjab	6,678,509	2,265,799	BHC/DDT	0.3/2.0	34.0
NWFP	1,612,707	744,917	BHC/DDT	0.4/2.0	46.8
Sind	1,425,298	38,591	BHC/DDT/ MAL	0.3/2.0/2.0	2.7
Baluchistan	330,860	88,326	BHC/DDT	0.3/1.0	37.5
	10,047,374	3,137,633	-	-	31.2

Insecticide supplies provided to the Punjab, Baluchistan, N.W.F. Provinces were fully consumed, whereas the Sind province was unable to utilize their allotment because of the non-availability of operational funds.

SPRAYERS (DECEMBER 1975) (10)

Province	No Assigned (Allocation)	No. Working	+ No. Repairable	No. Operational	No. Deadlined	No. Procurement
Punjab	8,000	-	-	4,700	-	3,500
	(8,141)*	(3,899)	(3,477)	(7,376)	(765)	-
Sind	2,901	-	-	2,000	-	600
	(3,001)	(1,370)	(1,336)	(2,706)	(295)	-
NWFP	3,172	-	-	2,000	-	1,200
	(3,172	(1,546	(326)	(1,872)	(1,304)	-
Baluchistan	570	-	-	450	-	-
	(646)	(260)	(196)	(456)	(190)	1,000
A. Kashmir	0	-	-	0	-	0
TOTAL:	14,643	(7,075)	(5,335)	9,150	(2,454)	6,300
	(14,960)			(12,410)		

*The numbers enclosed in parentheses were obtained from Provincial reports whereas the others were provided by the NHQ briefing paper.

The majority of the sprayers are very old and many more will become deadlined in the near future when full scale spraying becomes operational in 1976-77. Procurement proceedures for new sprayers and spare parts have been started.

Sprayer spare parts are needed to repair over 5,000 sprayers now remaining inoperable. Many of the spare parts produced and purchased locally do not meet the specifications for the Hudson X-pert sprayer being used in the program.

The locally made copy of the Hudson X-pert sprayer does not presently meet the specification put forth by WHO and its procurement should be deferred until it is determined that the local manufacturer has met those specifications. It is not economically justified that the program procure sub-standard equipment that has a short life span. Sufficient quantities of insecticide (malathion) is under procurement.

There are no Sanitary Engineers assigned to the malaria organization at the present time. The team feels that with the diverse use of spraying equipment, the expansion activities in urban malaria and the development of many irrigation projects that the presence of Sanitary Engineers is necessary at the Directorate level now and one at each of the provinces at a later date.

Vector density graphs for 1975 of some zones in the Punjab provincial office depict two definite peaks of vector development for the year. This raises the question as to the correct timing of the residual spray application for this program in the sectors and zones of the four provinces. Vector density patterns should be thoroughly studies by the malaria entomology staff before final timings and malathion dosage are determined for the different areas.

In some instances, the spraying operations have been based on the availability of insecticides rather than on the effectiveness of the insecticides against the vectors. Prior to the further use of the present stockpile of DDT and BHC stored in program warehouses throughout the country, the NHQ, provincial and zonal entomologists should thoroughly review vector suceptibility tests data in order to determine where this DDT and BHC can be applied effectively in specified sectors and sub-sectors during the next spray rounds. When DDT and BHC are no longer effective against the vectors in any of the areas of the country, these two insecticides should be discontinued. Malathion should be used in all doubtful instances.

5.2.3. Laboratory Services

There is no central cross-checking laboratory at the Directorate of Malaria. Gross-checking laboratories are established at the provincial and regional offices and some cross-checking of slides is done by senior microscopists at the zonal laboratories. The routine examination of slides is done at the zones. The laboratory services for the Sind province have been completely disrupted, whereas those of the other three provinces are functioning adequately. The organization has recently completed a survey on the lecation and condition of the microscopes and a program was developed to improve the efficiency of the microscopists and laboratories.

5.2.4. Reporting and Recording Systems:

The basic forms developed in the country program for spraying operations, geographical reconnaissance, entomology, laboratories, serveillance and evaluation are quite adequate and serve their purpose. The team was not in the position to determine if the staff using these forms and preparing reports fully understood their meaning and usefulness. It was obvious that the supervisory field staff and microscopists devote much of their time to the compilation of data and therefore must neglect their main duties of field supervision and the examination of slides. Statisticians and trained statistical clerks are needed at the zonal and provincial levels.

There was no uniformity of wall display data, charts, graphs, tables and maps for the several zones of a province and none whatsoever for the four provincial offices visited. Nor was there any uniformity in the presentation of technical data to the team during their field visits.

There is not a country malaria reporting and recording system that is perfect and it is only wise that the forms be reviewed periodically to improve them when necessary.

5.2.5. Transportation

All the work being planned in the near future will require a substantial fleet of vehicles in good working condition. This is not the case at the present time. The majority of the vehicles which are now in fair to poor operational condition are 10 to 15 years old and will be deadlined in the near future. New vehicles need to be procured as soon as possible if the planned spray coverage is to be achieved in 1976. Transport workshops similar to those in Lahore and Multan in Punjab province should be developed at all provincial, regional and zonal offices

to maintain all the vehicles in the program. A good system for the preventive maintenance of vehicles by all drivers should also be developed as soon as possible.

The present vehicle situation is given below:

Province	Total Available	No. in Operation	No. being procured
Punjab	180	110	27
Sind	61	21	19
NWFP	81	51	16
Baluchistan	17	13	25
A. Kashmir	0	0	13
	339	195	100

There is a total of 114 motor cycles being used by Assistant Malaria Superintendents and Inspectors in the provinces.

5.2.6. Staffing and Supervision

The authorized staffing patterns for the provinces and zones are available but the team did not get too involved with their details. There are over 5,800 employees for the authorized positions of officers and establishment. This number does not include the spraymen required for the spraying operation. The figures available concerning the authorized numbers and categories of employees appear to pertain to those required during this period of retrenchment due to the lack of funds and supplies and do not reflect the numbers of permanent employees required to do the work adequately when funds and supplies become available in the near future. The present patterns for staffing appear to be heavy on the administrative and custodial services and light on the technical and operational aspects. Vacancies now existing for the technical staff should be filled as soon as possible and the future technical staff requirements should be determined so that these people can be recruited and trained as they become needed in the program.

Supervision is an important factor that has been lacking at all levels of operations in the program during the past few years. The majority of the responsible officials realize this serious problem but find it difficult to enforce the normal supervisory and disciplinary practices since they are hampered by outside influences when attempting to exert disciplinary actions in order to improve the quality and

quantity of the employees work output. Good supervision is the key to a successful field operation such as malaria control and the program will not succeed unless supervision and discipline function properly. This is an internal problem that must be corrected within the organization as soon as possible.

5.2.7. (a) Training:

A plan should be made soon to train the people that will be needed to fill the vacancies existing in the province, region and zone offices and for the new positions that will open up as the program progresses. The training and re-training of the staff is a continuous process and it is important that they be conducted on a timely and thorough basis.

The quarters for the Malaria Eradication Training Center in Lahore will provide space for only twenty trainees at a time. The lecture - laboratory space is limited and it may be necessary to find a more suitable building in the near future if the number of trainees is too great to be accommodated properly.

5.3. "Urban Malaria in Pakistan with special reference to Karachi".

In the 1961 Plan of Operation no provisions were made for implementation of anti-malaria measures in the towns of more that 20,000 population. Urbanization in Pakistan has generated serious public health problems. In 1964 the urban population constituted 15% of the population, while in 1975 it is 29%. (9). At present the number of localities with population exceeding 20,000 are given below by province:

N.W.F.	7
Sind	28
Punjab	54
Baluchistan	1
Total:	90

The largest urban center, Karachi, has experienced considerable population expansion since 1941. The population increased from 387,000 in 1941, to one million in 1951, 1.9 million in 1961 and 3.8 million in 1968.(7) The 1975 population of Karachi is estimated at 4.5 million.

Since 1966 outbreaks of malaria in large cities have been recorded. In 1967 in Karachi, 0.8 million cases of malaria were reported (3). Malaria control activities upto date in urban areas have been negligable. Suspected malaria cases are treated by existing health institution within the town based on clinical diagnosis. Limited anti-larval activities are carried out by vector malaria control units of municipalities. These units generally are poorly budgeted, (Rs. 330,000 for city of Karachi in 1975), under-staffed and the personnel are not trained and [illegible] equipment in appropriate for larvicidal operations is being employed. The equipment ranges from broom and brush for oil application to power driven ULV applicators and electric fogging machines. The types of larvicides used in a city are diverse. In Karachi, the following compounds are being used as larvicide and insecticide: malaroil 30200 gallons per month, Baytex (carbamate) 5% concentration granules 5000 pounds/year, malathion 57% emulsion 90 gal., malathion 96% 80 gal. per/year, and Diazinon 10% granules 5000 pounds/year. Meanwhile in the city of Hyderabad, diesel oil, diptrex and Baygone are used. With lack of well trained personnel and proper spray pumps the dosage applied is not standard. No susceptibility tests of the vectors to applied larvicides and insecticides are available. No legislation for safe use of insecticides are inforce.

It should be mentioned that the vector/malaria control units of municipalities do a limited amount of source reduction by draining and pumping of stagnant pools of water formed in the city. In Karachi, local larvivorous fish Tilapia Mozambique and Lobestus sp. are utilized in small channels for biological control of vector larvae.

According to the extended plan of operation approved by The Government of Pakistan on January 5, 1975, the control of urban malaria was recognized as critical to the success of Malaria Control Program in the country. Therefore, urban malaria control was specifically provided for with combined efforts of local, provincial and Federal Governments. Based on this plan the provincial malaria organizations of Punjab, Sind and N.W.F.P. prepared a skeleton guideline plan of action for their urban localities. In Baluchistan, a coordinated plan for Quetta city was formulated to control urban malaria and mosquito nuisance. The plan is adequate except for the source of funding and time schedule for implementation. As it is envisaged, the local bodies should implement the anti-malaria measures, while the provincial malaria control office will assist the local bodies in preparation of a realistic plan of action for anti-malaria measures. In addition, MCPHQS should channel the central government assistance in the form of insecticides, spraying equipment and training of personnel to local bodies. MCPHQS also should carry out periodical evaluations of the program in urban

areas in order to assess the progress of the work and identify the areas for improvement.

In preparation of a plan of action for an urban locality the following subjects should be covered:

- Prior to any operational activities there should be adequate provision for geographic reconnaissance (G.R.) which would include population affected, type, numbers and exact location of breeding places.

- Collection of epidemiological and entomological baseline data for future evaluation of the program. This data will help to determine the malaria prevalence, vector(s) species, vector densities and vector susceptibilities to larvicides.

- Inventory of existing health institutions.
- Strategy of control program (treatment of cases and anti larval measures).
- Methodology and organization.
- Training of personnel
- Health education of governmental agencies and the public
- Evaluation mechanism for measuring progress of the work.
- Requirements in terms of supply and equipment.
- Financial implications and source of funds.
- Time schedule for activities.

Urban malaria generally is the result of poor sanitation practices, especially lack of proper water and sewerage systems. With provision of these utilities with proper design, breeding places will be significantly reduced and transmission of malaria will decrease. Actually, malaria in urban area is much more vulnerable to control measures than in rural areas, if there is comprehensive planning and well-organized implementation of the control measures.

5.3.1 Malaria Control in Karachi

Karachi is largest metropolitan area in Pakistan with 4.5 million (estimated) population covering an area of approximately 130 square miles.[7] Karachi is also the biggest focus of urban malaria in Pakistan.

Transmission is perennial. Mosquito breeding places are mainly located in the open drains which are discharged into two seasonal rivers, the Lyari and the Malir. The last ten miles of these two rivers cross through the city. In addition, there are tributaries of these rivers which also receive waste water and consequently form breeding places. It should be noted that these two rivers have been seasonal in the past. However, with the increasing population and the constant increase of water consumption and discharge, these rivers now form perennial breeding places. Furthermore, due to accumulation of silt in these river beds, water cannot flow naturally toward the sea and percolates into the ground causing water logging in the city. Anopheles stephensi, the main vector, can breed in almost any type of water collection available in the city, including the high polluted waste water in Lyari river. A. subpictus is also present in Karachi, but its role in transmission of malaria has not been clearly established.

It should be noted that every day 170 million gallons (mgd) of water enter to the city, but only 30 mgd are treated by two existing sewage treatment plants.(8) The rest of the water is discharged untreated into the river bed. The average annual rainfall in Karachi is 7.7 inches.(7) There is seasonal flooding which is directed toward the city through the above mentioned river beds and their tributaries. There is no provision of storm water drainage to cope with the flood waters. The only natural relief for the elimination of mosquito breeding places available is the high temperature prevailing during 9 months of the year which helps to evaporate a large quantity of water.

In spite of a master plan prepared by Karachi Development Authority (KDA), building and housing schemes are continuously developing without proper provision for a sewerage system. Only one third of the city residential units are connected to a sewerage system.

There is no legislation provision to control the situation. A new by-law has been prepared and submitted for approval to the Municipal Council.

KDA, which is an autonomous agency with its own governing board, is in charge of city development and environmental sanitation planning. They are well aware of the sanitation problems. The KDA, with UNDP cooperation, has prepared a plan with complete designs for expansion of the city's sewerage system and sewage disposal.

The new systems are expected to be completed by 1985. The number of sewage treatment plants will be increased to 8 serving 2/3rd's of residential units. By 1985, it is planned that out of 391 Mgd effluent from these sewage treatment plants, 257 Mgd will be used for agriculture expansion and development of a green belt around the city.(8) The remaining quantity of effluent will be disposed of through evaporation and percolation. In the interim, the construction of 2 barrages over the two river outside of the city limit and implementation of water shed management • control of the flood water is planned. This plan is expected to be completed in 1980. However, it appeared to city administrators are giving priority to develop of other utilities i.e. water, road and lighting etc. rather than to a sewerage system. Under the prevailing grave circumstances which endager the health of the people not only through transmission of malaria but also the transmission of a number of gastrointestinal and parasitic diseases which are carried by these open sewers and sewage ponds in the heart of the city, it is necessary to give high priority to the development of the sewage disposal. The other urban centers in Pakistan are no exception to the above statements.

Another project is in preparation for improvement of Lyari district in Karachi. This is a joint venture of KMC and World Bank which emphasizes the expansions of health services and the improvement of environmental health facilities.

Until such time that engineering solutions have been implemented for elimination of major breeding places, treatment of the malaria cases and routine anti larval operation must be carried out. The cleaning and clearing of existing open sewers, replacement of mainholes covers and dredging of the river beds will help the waste water to flow to the sea, thus reducing the breeding sites. A joint plan of action for these purposes must be prepared and thoroughly exercised by Karachi Municipal Corporation (KMC) and MCPHQs. WHO has already agreed to provide technical assistance through the services of sanitary engineer for urban malaria control. It is expected that the Government provide a national counterpart for the WHO Sanitary Engineer in order that continuity for this service be maintained.

5.4. INTEGRATION OF MALRIA CONTROL PROGRAM WITH GENERAL HEALTH SERVICES

In 1973 the Provincial governments of the Punjab, Sind, N.W.F.P. and Baluchistan formally agreed to merge the Malaria Control Program with the General Health Services in the Provinces. Thus the leadership of the malaria program was transferred to provincial secretariats of health - "Provincialization" of MCP. Only malaria employees in Baluchistan have been declared as regular government servants, whereas employees in the other provinces are still employed on a temporary basis.

No formal plans or programs for functional integration of the MCP with General Health Services have been endorsed by any provincial government, although certain proposals have been brought forward by the Directorate of Malaria Control (14) and the Provincial Headquarter (PHQ) of MCP in Punjab (15). In addition a pragmatic attempt at integration is under trial in Thatta District, Sind Province.

The concept of integration of PHQ of MCP in Punjab is shared by PHQs in Baluchistan, whereas N.W.F.P. has decided to postpone the issue for 2-3 years. The Punjab concept is tentative and is based on the integration of other specialized program, namely tuberculosis, smallpox, leprosy and acute communicable diseases, with the MCP. This network will be the backbone program for control of communicable diseases (CDC). The head of CDC will be responsible directly to the Secretary of Health. Respective resources, human and material, will be merged at operational and supervisory levels. The feasibility of this kind of integration has not been tested in the country. However, the concept does not give perspective for a closer coordination with with General Health Services; the lack of such a cooperation was considered one of the major reasons for the failure of MCP in Pakistan. (16)

The Provincial Government of Sind abolished the posts of zonal Chiefs of malaria organization and entrusted their functions to the of District Health Officers (DHO). The other specialized zonal malaria staff (Assistant Entomologists, Superintendents, etc.) have been attached to the offices of DHO. A pilot project was developed in the Thatta District in order to study the functional integration of anti-malaria and other health activities at the lowest operational level, as delivered in sub-sectors by malaria supervisors.

The malaria supervisors in Thatta District underwent 6-weeks of training at the district hospital in Thatta. They were trained in diagnosis and treatment of the most common ailments, vaccinations, and the control of communicable diseases , including smallpox. Thereafter each of them started functioning as a multipurpose health worker in a well defined geographic area. They spend two hours daily in their offices examining patients and distributing drugs. In The afternoon they makes home visits, giving presumptive treatment to suspected malaria cases and spraying houses with insecticides, in cooperation with fields workers involved in the smallpox eradication program, BCG technicians and workers involved in control of acute communicable diseases. These supervisors work under the immediate supervision of DHO and his office. They declare a better job satisfaction than when working for MCP alone. Since the Thatta project represents a serious attempt at delivery of primary health case, including malaria control, on an integrated basis, it seems neeessary to draw-up a detailed program of activities of this kind of workers and their . relationship to the whole system of health services in the District: Ci il and Tehsil Hospitals, rural centers and sub-centers, dispensaries, etc. This way, it will be possible to assess the pilot project more objectively and explicitly before its implementation in the Province. (For more information on Thatta project see Annex C).

The integration of the MCP with the health services (including the private sector and traditional Healers) is a process which requires changes in the behavior of the MCP and GHS personnel. It needs not only the transfer of knowledge and skills, but also a favorable attitude on both sides, Integration will not generate automatically or by a decree. It should be planned for and implemented step-by-step, starting from both sides, MCP and GHS, and approaching the common end. There are numerous examples which show systematic neglect of the existing opportunities for cooperation between the MCP and GHS, in the field of case detection, treatment, supply of antimalaria drugs etc., which make antimalaria activities less efficient and more costly.

In this process of integration, the simplest indicator for monitroing the progress will be the number and percentage of sub-sectors with integrated malaria control activities with general health activities.

6. Monitoring and Review of the Program

The integration of the MCP with GHS will open new perspectives for the monitoring and review of anti-malaria activities. The basic operational unit will be the sub-sector and the recording and reporting of events at that level will be the foundation of the monitoring and review. The records and reports used at present by both the MCP and the GHS should be adequately adjusted to the needs of the integrated program.

The monitoring should be done for defined time-periods, uniformly for the country, using the following indicators:

Epidemiological: number and percentage of sub-sectors in the district (province, country) with malaria parasite rate (or prevalence rate) above the target level.

Entomological: number and percentage of sub-sectors in which the spraying operations are contemplated and in which the vectors are resistant to insecticides.

Operational:

Integration: number and percentage of sub-sectors with integrated malaria services.

PCD: (a) Total outpatient attendance at health services,
(b) Number and percentage of slides examined,
(c) Number and percentage of cases diagnosed,
(d) Number and percentage of cases completing treatment.

Surveillance:

(a) Number and percentage of sub-sectors under epidemiological surveillance.

(b) Number and percentage of sub-sectors under entomological surveillance (out of those with unsatisfactory epidemiological indicators).

Number and percentage of sub-sectors under entomological surveillance that were sprayed.

Breeding source reduction activities

Deployment of resources

Resources / Source	Available and in use at the beginning of the period	Planned	Imple-mented	% imple-mented out of planned	Remarks

The annual review of the program should be made on the basis of the same indicators.

REPORT OF EXTERNAL REVIEW TEAM
December 1-20, 1975

Insert in page 21 under heading :
"Breeding Source Reduction Activities"

The following :

(a) Surface area of breeding places died up in m^2

(b) Linear meter of ditches dug for above purpose

(c) Cubic meter of earth removed for digging above ditches

(d) Density of vector larvae and adult to be recorded monthly.

7. Conclusion

7.1 The external review team considers the plan of operation for Pakistan realistic for the planned 5 year campaign, if it is implemented throughly. There are several logistic improvements which should be made for a successful operation of the annual programs. These logistics are referred to in Section 5.

7.2 The available health manpower, with the exception of some key vacancies at the provincial level, potentially can satisfy the needs of control action. However, the objectives of M.C.P. as stated in the Extended Plan of Operation (16) and the strategy of their attainment require detailed tactical planning (including health manpower planning) at the lowest operational level (Sub-Sector), an efficient leadership, a diversification of activities and approaches, re-alignment of the resources of the M.C.P. and of the health care system, supported by other sectors such as agricultural, local Governments, and municipalities. Re-training of personnel should play an important role in the process.

7.3 The integration of the M.C.P. with General Health Services is conceived of as a process which should start after meticulous programming, in the earliest possible phase of the Extended Plan of Operation. There are geographic areas in which the present malaria situation is satisfactory and can be maintained by a well organized P.C.D. (including laboratory diagnosis in existing facilities of General Health Services) with radical drug treatment and limited source reduction activities. In such cases, local General Health Services should be immediately strengthened in order to maintain the status quo. On the other side, there are areas in which only extensive spraying operations promise reduction of the malaria problem to the desired level. In these areas, concurrently with the classicial type of antimalaria activities, preparations for integration should be planned and implemented step-by-step. The local General Health Services must be capable of maintaining the achievement of the spraying operations after they are discontinued.

7.4 In the urban areas the improvement of sanitation facilities must be emphasized, especially for an accelerated program of waste water disposal reinforced by anti-larval measures. Malaria case detection and treatment is an absolute essential.

7.5 The planning, implementation, and monitoring of the control program should be constructed on a geographically-based surveillence network . For this purpose, the General Health Services should be regionalized following the pattern of the previous Malaria Eradication Program. Until PCD programs are in full operation, the current ACD system must be retained and strengthened. The entomological surveillance, including susceptibility testing should be dovetailed with the epidemological surveillance for the evaluation of all operations.

7.6 Education directed at the general public and responsible governmental agencies must be carefully planned. This education component is required in order to define the objectives of malaria control and gain the public support.

8. Acknowledgements

The team thanks the persons listed in Annex D for their information, assistance and hospitality during the review in Pakistan.

Annex A

Itinerary

29-30 Nov. 1975: Teams assembled in Islamabad

1 Dec. 1975: Introduction of the team members to the Directorate of Malaria, the four Provincial Chiefs M.C., the USAID Deputy Director, and USAID Public Health Advisor. Afternoon briefing session at the Directorate of Malaria, USAID.

2 Dec. 1975: Inauguration session for external services team by Dr. Z. Shaikh D.G. of Health. Present were : Officials of the Ministry of Health, Directorate of Malaria, Provincial Chief for MCP, USAID, WHO, UNICEF representative.

3 Dec. 1975: Team I

Departure from Islamabad, arrived Peshawer. Briefing session with Provincial Chief for MCP and Secretary of Health.

Team II

Departure from Islamabad, arrived Lahore, Briefing session with Provincial Chief for MCP and Secretary of Health.

4 Dec. 1975: Team I

Field visit to Kohat zone. Visited MCP zone offices, District Medical Officer, Field visits to observe surveillance operation.

Team II

Briefing sessions with PHQ- MCP staff and Lahore Municipality Urban Malaria Control group. Visited the National Malaria Eradiction Training Center.

5 Dec. 1975:

Team I

Visit to Peshawer zone office. Visit to Municipality of Peshawer . Met with the Municipal Medical Officer and Engineer. Visits were made to the Mayor of Peshawer, and Cantonment hospital.

Team II

Departure from Lahore, arrived Multan. Briefing at the Regional Office.

6 Dec. 1975:

Team I

Visit to Cantonment Command General Hospital . Final meeting with Secretary Health to discuss our finding.

Team II

Field visits to sub-sectors in Multan to observe surveillance operation and civil dispensaries.

7 Dec. 1975:

Team I

Departure from Peshawer arrived Karachi.

Team II

Visit to Multan zone office. Departure from Multan and arrived Lahore.

8 Dec. 1975:

Briefing with the Secretariat of Health. All District Medical Officers were present. Briefing by Medical Health Officer of KMC about vector control activities inside great Karachi Municipal. Commission (KMC) area.

Visit to Karachi Development Authorities. Briefed for present and future plan for sewage disposal in Karachi. Met Director of MCP, Sind Province.

Team II

Field visits to Sheikhupura and Gujranwala zones and health units.

9 Dec. 1975:

Team I

Departure from Karachi and arrived Hyderabad. Visit to Malaria PHQs. Visit to Municipal Health Officer and return Karachi.

Team II

Final meeting with Secretary Health not possible. Departed Lahore, arrived Quetta. Briefing at Provincial M.C. Office.

10 Dec. 1975:

Team I

Departure from Karachi arrived Thatta. Visit to District Health Office, Dispensaryat Gharu and return to Karachi

Team II

Briefing at PHQ- M.C. Office and with Secretary of Health.

11 Dec. 1975:

Team I

Meeting with Municipal Health Officer and his staff at KMC. Meetings with the Municipality Chief Medical Officer, the D.H.O., Director of KDA

Team II

Briefing at Quetta . Provincial and Zone offices. Field visits to health unit. Discussion with Secretary of Health and PHQ. M.C. Officer.

12 Dec. 1975:

Meeting Secretary of Health. Visit to vertebrate Pest Control Center Karachi.

Team II

ANNEX B

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ANNEX C

THATTA PILOT PROJECT, SIND

Basic Information

1.	Estimated Population of the District :	700,000
2.	Health Services :	66
	2.1 Civil Hospital	1
	2.2. Tehsil Hospital	1
	2.3 Rural Health Centre	2
	2.4 Rural Sub-Centre	6
	2.5 Dispensaries with Medical Officers	7
	2.6 Dispensaries without Medical Officers	35
	2.7 Other Institutions (MCH, FP, etc.)	14
3.	Field Health Peronnel :	69
	3.1 Malaria Supervisors	27
	3.2 Smallpox Workers	27
	3.3 BCG Vaccinators	4
	3.4 Other Public Health Workers	11

4. Malaria Works :

4.1 An estimated 10% of outpatients attending at Hospitals and rural health centres are diagnosed on clinical ground as malaria.

4.2 Hospitals and rural health centres do not examine blood for malaria in their laboratories which are equipped with microscopes.

4.3 Slides are prepared and sent to the Zonal malaria laboratories only recently by malaria supverisors/ multipurpose workers. The interval between blood collection in the field and receiving of the report in more than one month.

4.4 ACD has been discontinued

4.5 A partial spraying with malathion of 15000 houses (out of estimated 140,000 houses of lthe zone) was completed by field workers listed in point 3 of this Annex, in August 1975. Spraymen were not recruited for the job.

ANNEX D

PERSONS CONTACTED

1. Islamabad

a) Federal Ministry of Health :

d Dr. Naseer Ahmad B. Shaikh, Director General of Health/Additional Secretary.

b) Malaria Control Directorate

Dr. S.M. Mujtaba, Director Malaria Control.

c) WHO

1. Dr. A. Arif, WHO representative Pakistan
2. Dr. A.H.A. Mashaal, WHO Senior Malaria Advisor

d) USAID

1. Mr. J.C. Wheeler, USAID Country Director, Pakistan
2. Mr. W.R. McIntyre, USAID Assistant Director, Pakistan
3. Mr. Howard B. Keller, USAID Chief Health & Nutrition (A)
4. Mr. Lawrence Cowper, USAID Malaria Advisor, TAB/H, AID W

e) Dr. Richard Baker, Director, Pakistan Maryland Research Center, Lahore

II. N.W.F.P.

a) Health Secretariat

Brig. Mohammad Aslam Khan, Secretary of Health, N.W.F.P.

b) MC PHO

1. Dr. Azmat Khan Afridi, Provincial Chief, M.C.
2. Mr. Ashique Hussain, Acting S.M.S. M.C.P.H.
3. Mr. Abdul Rahim Khan, Acting Zonal Chief, Peshawer
4. Mr. Akhtar Hussain, Acting Zonal Chief, Kohat
5. Dr. Saeed Umar, District Health Officer, Kohat District
6. Mr. Warrez Khan Afridi, Provincial Health Education Officer
7. Mr. M. Fazil Raziq, Provincial Entomologist

Punjab

a) Health Secretariat

1. Dr. Faiz Ali Shah, Secretary of Health

b) MC, PHQ

1. Dr. M.I. Rajput, Acting Provincial Chief
2. Dr. Muhsin Mubbarik, Epidemiologist
3. Ch. Mohammad Saeed, Entomologist
4. Mr. Mukhtar Ahmad Shah, Parasitologist

c) RHQ, Multan

1. Dr. Javaid Rashid, Acting Regional Chief
2. Mr. M. Nasir-ud-Din, Entomologist
3. Ch. Riaz Ahmad, Senior Malaria Superintendent

Baluchistan

a) Health Secretariat

1. Mr. Anwar Zaman Khan, Deputy Secretary

b) MC, PHQ

1. Dr. N. Ghickki, Provincial Chief
2. Mr. M. Akhtar, Assistant Entomologist
3. Mr. K. Hussain, Senior Malaria Superintendent

c) Peshawer Municipality :

1. Mr. Zahur El Hussain, Administrator Municipal Council
2. Dr. Nour Mohammad, Senior Municipality Health Officer, Peshawer
3. Eng. Altaf Ahmad, Municipal Engineer.

d) Cantonment Peshawer

1. Col. Tanvir, Chief Medical Officer Cantonment
2. Lt. Col. Hussain, Deputy Chief, M.O. Cantonment
3. Dr. Riaz Ahmad, Medical Officer Cantonment.

III. Sind Province

a) Health Secretariat

1. Dr. Ali Muhammad Ansari, Secretary of Health, Sind Prov.
2. Dr. Sedighi, Assistant Secretary, Sind Province
3. Dr. Abass Ali Ghoomro, Provincial Chief, M.C.P./S.P.
4. Mr. Abdul Mutalib, Entomologist, MCP
5. Mr. Zamir El Din, Health Educator, MCP
6. Mr. Abdul Majid Khan, Sr. Malaria Superintendent, MCP
7. Dr. Ghulam Mustafa, District Health Officer, Thatta
8. Dr. Devas Ahmad, Asst. Health Officer, Thatta
9. Dr. Khalid Rashid, D.H.O. Karachi
10. Mr. Zahid Hussain, Malaria Syperintendent, Karachi Zone

b) K.M.C.

1. Dr. Nour M. Abbasi, Chief Health Officer, K.M.C.
2. Dr. Niazi , Asstt. Health Officer, K.M.C.
3. Mr. Altaf , Entomologist, K.M.C.
4. Dr. M.A. Ghani, Chief Medical Officer, KM.C.
5. Dr. Zaid, Asstt. Medical Officer, K.M.C.

c) K.D.A.

1. Mr. Abbas Shahid, Director
2. Mr. Akhlaq Ahmad, Asstt. Director
3. Mr. Abdul Hamid, Asstt. Director