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PROJECT COMPLETION REPORT

MALARIA CONTROL II PROJECT

391-0472

UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

ISLAMABAD, PAKISTAN

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I. BASIC PROJECT DATA

Project Title: Malaria Control II
Project No: 391-0472

Date Authorized: May 11, 1982
Date Agreement Signed: May 19, 1982

Date Project Extension Authorized: September 28, 1988
Date Agreement for Extension Signed: September 29, 1988

Amount Originally Authorized: \$41 Mil and Rs. 21 Mil
Additional Amount Authorized: \$25 Mil
Total: \$66 Mil

Amount Obligated: \$61 Mil and Rs. 21 Mil
Amount Disbursed: \$59.698 and Rs. 21 Mil
Amount Deobligated: \$ 1.302 Mil

Project Assistance Completion Date: September 30, 1992
(PACD)

Grantee's Authorized Representatives

Principal: Deputy Secretary, Economic Affairs
Division (EAD), Ministry of Finance and
Economic Affairs, GOP

Additional: Director, Directorate of Malaria Control
(DOMC), Ministry of Health (MOH), GOP

Implementing Agencies:

Federal Directorate of Malaria Control (DOMC),
Ministry of Health (MOH), GOP

Provincial Provincial Health Departments

USAID Project Officer: Dr. Rifaq A. Ismail

II. THE PROJECT GOAL AND PURPOSE:

Goal: The overall project goal was to reduce morbidity and mortality from endemic diseases, especially malaria, through an effective nationwide health delivery system.

Purpose: (1) To assist the Government of Pakistan (GOP) to contain and further reduce the incidence of malaria in the country, maintaining malaria incidence at a level where it does not constitute a major health problem; and (2) To assist the GOP to develop greater self-reliance in malaria control so that after 1992, minimal or no donor input would be required.

Assistance was directed towards:

1. Expanding the capacity and increasing the capability of federal, provincial and municipal health services to effectively control malaria;

2. Moving the vertically organized malaria control program to stress vector control operations through total coverage of insecticidal house spraying;

3. Integrating the malaria control program and malaria surveillance operations using a combination of selective vector control methods and a better balance between the surveillance methods of active case detection (ACD) and passive case detection (PCD).

The Project Agreement visualized assistance to the GOP's malaria control program to achieve the following objectives:

1. An annual malaria parasite incidence (API) at or below 0.5 cases per thousand population (or 500 cases of malaria per million population) in each province, including urban areas;

2. P. falciparum malaria to represent less than 2% of all cases of malaria;

3. The number of blood smears (slides) collected through passive case detection (PCD) to exceed the total number of slides collected through malaria outreach workers (ACD);

4. Vector control insecticidal spray coverage of rural dwellings (houses) not to exceed 25% of all houses in the project's targeted coverage area in the country, and spray each season to cover at least 95% of the planned number of houses in the targeted areas.

The Project Extension in 1988 stressed project implementation actions to promote program sustainability and modified the project approach to vector control, surveillance, human resource development and research. Project Extension objectives were to:

5. Maintain API at or below 0.5 cases per thousand population;
6. Contain *P. falciparum* infection to less than 20% of all malaria cases in Pakistan;
7. Improve malaria surveillance by increasing the proportion of slide collection through PCD to 70% of total number of slides collected. On the recommendation of the External Evaluation Team (ERT) 1990, these targets were modified through a project implementation letter (PIL) to 25% for the urban areas, and 40% for the rural areas;
8. Reduce household spraying to less than 25% of all houses in targeted rural areas by determining malaria foci on the basis of epidemiological data, and achieve more than 95% spray coverage of targets identified in the annual spray planning;
9. Conduct operational research to target indigenous operational problems as identified by DOMC and provincial programs;
10. Increase the number of village health workers (VHAs) or voluntary collaborators (VCs) at static PCD posts;
11. Computerize the existing Malaria Information System (MIS).

III. PROJECT COMPONENTS

1. **Program Management:** short and long term technical assistance to strengthen the program.
2. **Training:** strengthening the training capability of the National Malaria Training Center (NMTC). Long and short term participant training for malaria and general health services staff in specific aspects of malaria control were included.
3. **Operational Research:** providing TA, budget support, supplies and equipment for basic and operational research, modified in the 1988 project extension to support operational research only. A number of operational research studies were earmarked for each year. Project funds were identified to procure or construct a building for the NIMRT.
4. **Commodity Support:** providing program-related commodities. The project extension added commodities to facilitate the establishment of malaria microscopy diagnostic centers at provincial health and training facilities.

IV. PROJECT ACCOMPLISHMENTS

The final external evaluation of the project, carried out in September 1992, concluded that in ten years malaria transmission had been contained at an acceptable level of an API of 0.89 cases per 1000 population, a 94% reduction from an API of 13.75 cases per 1000 population prevalent in 1973, and that significant progress had been made in improving PCD and in decreasing program reliance on costly insecticides.

1. Malaria Incidence

During the LOP, malaria transmission was contained to an API of 0.89 cases per thousand population. *P. falciparum* malaria constituted 40% of all malaria cases.

2. Malaria Surveillance

The malaria program is now integrated with general health services. Malaria diagnostic laboratories were decentralized and established at Rural Health Centers and Basic Health Units in addition to those established at district and provincial headquarters. Malaria microscopic training units were established to train diagnostic staff of the health delivery services (hospitals, Rural Health Centers, Basic Health Units and dispensaries). The greater role of health facilities in malaria case detection has led to prompt examination and treatment of malaria positive febrile cases and has contributed to reducing the malaria parasite reservoir in humans.

The proportion of blood smears taken by PCD method at health facilities improved from 12% in 1985 to 26% (25.88) in 1991. Of all malaria cases, 65% were detected through PCD rather than through ACD. In 1992, 26% of blood smears collected from febrile cases were screened at general health services posts and 60% of all malaria cases nationwide were detected at the health posts as compared to malaria posts. This trend has promoted the sustainability and cost effectiveness of the Pakistan Malaria Control Program.

3. Insecticide Use

Dependence on insecticide has been reduced by 65% since 1985. The new malaria control strategy focussed insecticidal spray operations on areas of high incidence of vivax malaria and/or predominance of falciparum malaria. Targeted reduction of the number of houses programmed for spraying had been attained and, by 1991, the percentage of houses sprayed was well below the stated target of 25% of existing houses, without negative effect. This strategy helped reduce the requirement of residual insecticide for the program, subsequently reducing the cost of the program and promoting self-reliance on the part of the GOP.

4. Malaria Information System

An appropriate foundation has been laid to establish a computerized Malaria Information System (MIS). In the last year of the project, computer equipment was provided and computer literacy training was arranged for the malaria information staff at federal and provincial levels to enable them to establish a computerized MIS. A prototype computer program, PAKMAL, was developed to record and display the MIS for various levels of information collection. PAKMAL was developed by consultants from the VBC Project (AID/W). The system will be studied and modified as necessary. Complete acceptance of this program was not found at all five federal and provincial levels. It is expected that with improvement of PAKMAL during the bridging assistance period and with additional inputs from the federal and provincial governments, the chances for a functioning computerized Malaria Information System will improve.

5. Operational Research

The project was less successful in developing a strong operational research capacity and in developing alternative control measures. However, the GOP realized the need to give high priority to operations research. The project assisted the GOP in establishing a National Institute of Malaria Research and Training (NIMRT) at Lahore. The research agenda of NIMRT was modified from general malaria research to operational research focussing on problems related to *P. falciparum* resistance, cost effectiveness of alternate insecticides, vectorial capacity of common vectors, and invitro and invivo resistance to anti-malaria drugs, especially chloroquine.

Project funds were provided for the first stage of trials in the use of alternate insecticides Actellic, Icon, Bendiocarb, and Deltamethrin. to carry out trials in the use of alternate insecticides. USAID provided technical consultants to develop protocols for research study and for identifying the role of *Anopheles stephensi* in malaria transmission in Pakistan. In-country training programs were arranged to develop operational research management expertise.

Under the follow up bridging assistance program, project funds were provided to carry out the second stage of trials in the use of alternate insecticides and to study the role of *Anopheles stephensi*.

6. Health Education

Extensive use was made of radio and television media, in all local dialects and languages, to broadcast malaria health education messages for malaria prevention and surveillance, personal protection, environmental management, the benefits of

spray operations and safe guarding against toxic effects of spraying.

7. Training (Manpower Development)

The project developed and increased the number of indigenous experts in malaria control subjects through participation in in-country and participant training programs (of long and short term duration) in the USA and third country universities and training institutions. These training programs for health and malaria control staff were particularly effective in increasing the sustainability potential of the Malaria Control Program.

8. Evaluation

Eight external evaluations of the project and its components took place with participation of local, WHO and US expertise. The findings and recommendations of identified weaknesses and achievements of the program, helped to modify project activities, strategy and the operational research agenda.

9. Urban Malaria Control

During LOP, seven municipal corporations - Karachi, Hyderabad, Lahore, Peshawar, Mardan, Rawalpindi and Islamabad - met conditions for establishing malaria case detection and treatment services at health facilities to enable them to participate in malaria vigilance in their cities and surrounding areas. They were provided urban malaria equipment.

10. Epidemiological Benchmarks

Epidemiological data consolidated for the years 1991 and 1992 is attached as Tables 1 & 2.

V. LESSONS LEARNED

Malaria control in Pakistan is a long term activity. Increased self-reliance on the part of the Government of Pakistan, continued and improved epidemiological and entomological surveillance, eradication of human malaria parasite reservoir and focus spraying are the keys to maintaining and improving the program.

Coordination within the Ministry of Health at the federal level and provincial health departments (Malaria Control Coordination Committee) and intersectoral coordination between the MCP and agriculture, irrigation, education and other relevant departments of the government are necessary. MCP integration with general health services can lead to an improvement in malaria control if health facilities are expanded and accessible in rural areas.

Continuous training of local malaria control personnel strengthen the operations and increase the commitment and motivation of malaria control staff in carrying out surveillance, operations, and supervisory and management functions. Short term training, in particular, has enabled practical and effective modification in the program such as reduced reliance on insecticides and an increase in operational research.

Health education, the promotion of case detection and treatment services at health posts in rural areas increases public mobilization and cooperation, improving surveillance and data collection. In addition, monitoring the transmission of P. falciparum malaria is crucial to reducing insecticide dependence

Increased use of insecticides is not a viable method of malaria control because of the cost and necessity to import, as well as environmental concerns. Requirements should be reduced to essential levels, concentrating on cost effective focus spray operations. Monitoring a cost-effective insecticide for the program will decrease the dependence on imported insecticides and increase GOP self-reliance. The stable availability of the strategic needs of insecticides for essential vector control operations and of anti-malarial drugs must be maintained for the viability of the program.

Operational research can identify workable control methods and promote accuracy in epidemiology forecasting and decision making.

One key to increased surveillance is the information system. If fully developed, the Malaria Information System would provide an early warning system for any increase in malaria incidence or impending epidemic. Effective surveillance would also be increased if a more thorough identification of risk factors were incorporated into the MIS.

Finally, the advances made over the LOP cannot be sustained without assured and continuous financial resources.

VI. PROJECT DONORS

During the LOP, in addition to USAID, WHO, UNHCR, and the Government of Japan (GOJ) contributed to the project.

1. USAID

The USAID contributions to the project encompassed the following:

a. Technical Assistance

During the 10 years LOP, 67 person months (PM) of long-term technical advisory services were provided to implement the project activities. In addition, 31.57 PM of short-term technical

assistance was provided in the fields of: computerization of malaria surveillance procedures; protocol writing and field research; environmental assessment of the project; insecticide assessment and evaluation; and alternative methods of malaria control.

b. Training

The Project offered long and short term, in-country and participant training opportunities in malaria control subjects. DOMC and the NIMRT helped to facilitate many of the in-country training programs. USAID funds were allocated for trainee travel and per diem costs, and technical assistance of expatriate consultants.

In-country Training: Training of 2-15 days duration was provided to 500 personnel of the malaria control staff, including the urban malaria control staff. The Project also provided short in-service training to more than 6000 personnel of the malaria control program staff from Directors to Medical Superintendents incharge of hospitals, clinics and dispensaries. In addition, Malaria Microscopy Training Units were established at each provincial headquarters to train laboratory diagnostic staff. The training faculty for these units were also trained at NIMRT.

Training subjects included program administration and operations, health education, geographical reconnaissance, malaria case detection, epidemiological and entomological monitoring, blood smear collection, malaria microscopy, chloroquine resistance testing, entomology, larviciding, adulticiding, insecticide safety measures, spray techniques, ULV equipment maintenance, and alternate control methods.

Details of training programs with number of persons trained are given in Tables 3, 4 & 5.

Participant Training:

The Project implemented participant training programs in the U.S. and third country institutions for a total of 165 personnel for 253 PM. Long-term training was provided to 9 personnel for 148 PM and short-term training was conducted for 156 personnel for 105 PM. Table 6 provides details of long-term training provided during the LOP.

c. Commodities

Project funds were used to procure insecticides and spray equipment, vehicles, diagnostic and research equipment, computer and office equipment. The commodities/equipment procured during the LOP are as follows:

Insecticide Malathion (50% WDP)	22,151 MT
Spray Pumps	15,700
Nozzle Tips	100,000
Supervisory Vehicles	105
Bicycles	1,610
Diagnostic Microscopes	1,031
Computer Equipment (Hard and software sets)	6
Research Equipment (Incubators)	4
Operational Equipment:	
Plain paper copier	2
Slide projector	1
Folding Screen	1
Instruction board	1
Flip Charts/stand	1
Furniture Sets (tables, chairs, chalkboard) for provincial MMTC	
Conference Table	1
Chairs	20
Table	1
Bookshelves	4
Carpet/window blind set	1
Urban Malaria Equipment:	
Heavy Duty ULV Fogging Machines	50
Mini ULV Fogging Machines	50
Spray Pumps	1100
Microscopes	31

d. Research

Under USAID funding, the mandate for research in malaria control was changed in 1983 from academic to operational. Research was carried out by the International Center for Malaria Research and Training (ICMRT), a University of Maryland outreach center. After more than a full year of operation, USAID terminated funding to ICMRT. A USAID evaluation team found the Center's senior staff lacked malariology expertise and that very few of the current or proposed activities would be useful to the Malaria Control Program. In 1985, ICMRT was nationalized and integrated with the Malaria Training Center to establish the National Institute of Malaria Research and Training (NIMRT). Costs of operational research carried out at NIMRT between 1985-87 were paid out of Malaria Control II Project funds. From July 1987, the costs were taken on to the role of GOP's annual budget.

During the Project extension, project funds were used for training programs pertaining to research, as well as for specific studies.

Operational Research: Salient operational research studies carried out by NIMRT with Project funds:

1. Comparative Trial in the use of Malathion vs. Fenithrothion
2. Trial in use of Alternate Insecticides Actellic (Pyrimiphos methyl), Icon (Lambda Cyhalothrin), Bendiocarb and Deltamethrin: comparing the effectiveness of insecticides in an attempt to find other cost-effective insecticides.
3. Trial in the Role of Anopheles stephensi in malaria transmission in Pakistan: on-going research (January 1993-January 1994): investigating whether the MCP should switch from Malathion to other insecticides for residual house spray to intercept malaria transmission. Field studies in Punjab and Sindh showed that Anophelese stephensi has developed a resistance to Malathion, the insecticide being used by the program.

NIMRT Building and Operational Costs: During the LOP, funds were set aside for the purchase or construction of a building for NIMRT. Plans had been prepared to strengthen the research capabilities of the center. These activities could not be accomplished before the completion of the MC-II project due to delayed release of land by the Punjab Government.

NIMRT recurrent costs, covering staff salaries and research operations, amounting to Rs. 2,500,000 for the initial two years (FY1985,1986), were financed out of project funds.

2. Other Donors

a. World Health Organization (WHO)

WHO provided technical assistance, training fellowships, research grants, commodities and anti-malaria drugs to the Pakistan Malaria Control. Due to funding constraints, however, WHO financial assistance amounted to not more than \$200,000 biannually .

b. United Nations High Commission for Refugees (UNHCR)

UNHCR provided funding support for malaria control activities in Afghan refugees camps located in NWFP, Balochistan and Punjab for malarial surveillance, personnel, transport, spray equipment and insecticide and drugs.

c. Government of Japan (GOJ)

The GOJ provided 433 MT of Somithion (Fenitrothion) for spray operations during 1982-1984. Some sprayers, transport vehicles (for supervisory duties), sedan cars and other equipment

were also made available to the Malaria Control program. The GOJ contribution amounted to approximately \$7.7 M, including \$2 M for insecticide.

3. Government of Pakistan (GOP)

The GOP, under the bilateral grant agreement of 1982 and the project extension agreement of 1988, was committed to provide Rs 1,056,476,000 during the LOP. These funds were for the development and non-development costs of the GOP Malaria Control Program during the LOP. These costs included local salaries of malaria control staff in the federal and provincial governments, recurrent costs of field operations, supervision, spray operations, incountry training, research operations, P.O.L. costs, per diem and travel costs of program operation staff. The actual GOP contribution is as follows:

Development Costs:	Rs. 1,518 Mil or \$ 90.7 Mil
Non-Development Costs:	Rs. 58 Mil
(Federal & Provincial)	@ Rs. 5 M/Yr during 1982-83 - 1986-87
	@ Rs. 6 M/Yr during 1987-88 - 1992-93

NIMRT allocations between 1985 and 1992 totalled Rs. 13.69 million.

VII. STATUS OF COMPLETION OF PROJECT ELEMENTS

1. Insecticide and Other Commodities

Of 22,151 MT of Malathion procured/imported with project funds, 21,151 MT were used in spray operations. The remaining 1000 metric tons will be used in 1993. The majority of the 15,700 spray pumps procured are in functional order and the majority of the 100,000 nozzle tips were used in spray operations.

One vehicle, a Suzuki pickup, was involved in a road accident in Thatta District, Sindh, in which one malaria control officer was also killed. The remaining vehicles are in functional order.

Urban Malaria Equipment, including vehicles on which the spray equipment were mounted, are also in working order. The diagnostic microscopes that were provided are working, except for problems with the electrical systems. The complaint is being looked into by the USAID Office of Commodities for advise to the manufacturers.

All computer units (hardware) are functioning, except the software utilities at provincial headquarters, which should be replaced by the respective provincial departments. The research and operational equipment, and the furniture for research and training units are all in functional order.

2. Technical Assistance

The project was completed on September 30, 1992, and under Pressler Amendment, USAID cannot provide any additional assistance. However, to safeguard against a possible malaria resurgence in the absence of an identified follow-on donor, USAID arranged some technical assistance (both LT and ST) through January 31, 1994, out of PDIF funds, for facilitating the logical conclusion of vital operational research activities initiated during the LOP, and to monitor vector control activities, safe handling of insecticide training and assessment to identify cost effective insecticide for future malaria control. This assistance amount to \$430,700.

VIII. EPIDEMIOLOGICAL AND ENTOMOLOGICAL ASSESSMENT OF A COST EFFECTIVE INSECTICIDE FOR PAKISTAN MALARIA CONTROL

Several reports indicated that malaria, especially *P. falciparum*, was predominant in areas that have abundance of secondary malaria vector mosquitos and *Anopheles stephensi*. Susceptibility studies indicated resistance to the currently used residual insecticide, Malathion. These findings lead to suggestions that Fenitrothion be introduced selectively into the program in areas where susceptibility tests showed *Anopheles stephensi* mosquito survival was more than 50% in the last two years and where there was clear evidence of more than a normal incidence of malaria.

Project-supported entomological review of insecticide resistance in malaria vector mosquitos in 1986 and 1990 identified the relationship between the proportion of Malathion resistant vector mosquitos and *Anopheles stephensi* with more than normal malaria incidence in several southern areas of the Punjab. However, before making a decision on whether or not to switch to another insecticide, an epidemiological analysis was conducted. Unnecessary introduction of Fenitrothion would have serious consequences because of its greater toxicity to humans and of lowering the susceptibility of vector mosquitos to Malathion.

An epidemiological analysis was carried out in 1990 in 14 areas with a predominance of *Anopheles stephensi* and a high resistance to Malathion. The study concluded that vectorial competence of the *Anopheles stephensi* was not unequivocally established and that residual insecticidal spray with Malathion was still effective. The analysis also concluded there was no correlation between increased resistance to Malathion of vector *Anopheles stephensi* and total incidence of malaria in the area. With this inference and advice, the project continued Malathion spray in the years subsequent to 1990. It was also decided that a similar study be carried out in 1993 to review the cost effectiveness of Malathion

and, if necessary, review introduction of another insecticide. In the meantime, trials of the alternate insecticides Actellic (Pirmiphos-methyl), Icon ((Lambda Cyhalothrin), Bendiocarb and Deltamelthrin were to be carried out.

IX. SUSTAINABILITY

Malaria has the potential of resurgence if it is not continuously monitored and a control program continued with good management practices. When USAID and other donor assistance is not available, the GOP needs to play the role of donor for provincial programs in order to keep all aspects of the program fully functioning and funded. Without this, the program progress cannot be maintained and malaria incidence cannot be contained to the level achieved under the project.

The GOP Planning and Development Body, CDWP, approved the PCI (PP equivalent) of the program extension for FY 1993-94 through 1997-98. The PCI will be reviewed soon by the Executive Committee of the National Economic Council (ECNEC). With the approval of the ECNEC, it is expected that the GOP will carry out malaria control program activities beyond the USAID assistance, i.e., January 1994.

The PCI anticipates that the foreign exchange component of the program, amounting to \$15 million, will be funded by a donor agency. For the sake of sustainability and in the background of the fact that no donor agency has shown any commitment for the proposed FX cost of the program, the GOP should fund this amount: \$2.8 M per annum. The malaria control program is vital to agriculture and to the rural sector of the government's economic uplift program. Continued inputs will provide continued benefits to the GOP.

Clearance: SSP - Rushna Ravji (draft)
 SSP - Lois Bradshaw (draft)
 PSD - Shaukat Javed (draft)
 OPO - Mike Hauben (draft)
 FM - ~~Linda Martin~~ *DM*
 David S. Noble

(over)
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1. CONSOLIDATED EPIDEMIOLOGICAL DATA FOR THE YEAR 1991

PROVINCE	A.C.D		P.C.D		OTHERS (BCL, MBS, FOLLOWUP)		TOTAL		CLASSIFICATION				SPR %	API %	POPULATION
	SLIDES	+VE	SLIDES	+VE	SLIDES	+VE	SLIDES	+VE	V	F	M	MDX			
PUNJAB	1292345	7024	216318	5275	95201	1439	1603864	13938	9804	4247	-	3	0.87	0.311	4488809
SINDH	313100	5441	242044	15172	30288	1499	585432	22112	6863	15183	-	34	3.78	1.742	12548039
N.W.F.P.	206070	5222	224808	21574	35485	1044	469363	27840	22007	5833	-	20	5.93	2.192	12700003
BALUCHISTAN	20223	525	10657	16654	23047	517	53927	2896	1082	1645	-	11	5.00	0.461	4076336
PAKISTAN	1831738	18212	693827	43675	187021	4899	2712586	66586	39726	26928	-	68	2.45	0.897	74190388

1991

PROVINCE	PCD PERCENTAGE OF		FALCIPARUM
	SLIDES	+VE CASES	
PUNJAB	13.49	37.85	30.17
SINDH	41.34	68.61	68.66
N.W.F.P.	47.89	77.49	21.02
BALUCHISTAN	19.76	61.35	51.02
PAKISTAN	25.58	65.59	40.44

2. CONSOLIDATED EPIDEMIOLOGICAL DATA FOR THE YEAR 1992

PROVINCE	A.C.D.		P.C.D		OTHERS (BCS,MRS FOLLOWUP)		TOTAL		CLASSIFICATION						
	Slides	+ve	Slides	+ve	Slides	+ve	Slides	+ve	V	F	M	MIX	SPR %	API %	POP (1000)
PUNJAB	1245138	16797	202163	2319	139669	10531	1586970	39647	19050	20632	-	35	2.49	0.563	70.16
SINDH	297882	4971	249169	20304	46182	3457	593233	28732	1856	20267	-	51	4.84	1.464	19.62
N.W.F.P.	196550	5766	209883	21475	41404	1136	447837	28377	17422	10964	-	9	6.33	1.430	19.84
BALUCHISTAN	10524	2242	35569	3539	18002	547	64095	6328	1358	5022	-	52	9.87	0.992	6.38
TOTAL	1750094	29776	696784	57637	245257	15671	2692135	103084	46346	56885	-	147	3.82	0.889	116.00

PROVINCE	PCD PERCENTAGE OF		FALCIPARUM RATIO (%)	TOTAL +VE CASES
	SLIDES	+VE CASES		
PUNJAB	12.74	31.07	52.04	39647
SINDH	42.00	70.66	70.54	28732
N.W.F.P.	46.86	75.68	38.64	28377
BALUCHISTAN	55.49	55.93	79.36	6328
TOTAL	25.88	55.92	55.18	103084

1992 data includes urban population.

3. TRAINING PROGRAMS ARRANGED BY DOMC

Year	No. of Training Programs Conducted	No. Of Participants Trained
1982	-	-
1983	-	-
1984	-	-
1985	3	118
1986	6	350
1987	10	297
1988	2	132
1989	9	345
1990	6	238
1991	4	60
1992	4	264

4. TRAINING PROGRAMS ARRANGED BY NIMRT

Year	Number of Training Programs Arranged	No. of Participants Trained
1982	6	119
1983	4	57
1984	10	226
1985	5	149
1986	17	397
1987	21	429
1988	10	276
1989	8	154
1990	9	190
1991	7	125
1992	8	141

5. MALARIA MICROSCOPY TRAINING

Year	No. Of Training Programs arranged	Number of Participants Trained
1988	-	-
1989	-	-
1990	3	48
1991	6	57
1992	4	16

6. PARTICIPANTS IN LONG-TERM TRAINING PROGRAMS

Participant	Training Dates	University	Duration (P/M)	Subject
Asmatullah Jogzai (Federal)	1/88 to 8/89 (19 PM)	Tulane University	21 PM	Public Health
Dr. Rashid Iqbal (NWFP)	8/89 to 8/90 (12 PM)	Tulane University	18 PM	MS (Lab. Sciences)
Dr. Abdul Jamil (NWFP)	1/89 to 1/91 (24 PM)	Tulane University	24 PM	Master in Tropical Health & Epidemiology
Dr. Riaz Ahmed Malik (Federal)	8/89 to 8/90 (12 PM)	Tulane University	18 PM	MS Tropical Health
Dr. Tahir Parvez Mir (Punjab)	8/89 to 8/90 (12 PM)	Tulane University	12 PM	Public Health Administration
Dr. Abdul Ghaffar (Punjab)	1/89 to 1/91 (24 PM)	Clark University	24 PM	Medical Administration
Dr. Fiaz Mohammed (Punjab)	8/89 to 8/90 (12 PM)	Tulane University	24 PM	Tropical Medicine
Mr. Javed Iqbal Malik (Punjab)	9/90 to 12/90 (15 PM)	University of California Toronto	15 PM	Course in Insecticide Resistance
Mr. Fazal Raziq (NWFP)	1/91 to 1/12 (12 PM)	University of California, Toronto	12 PM	Course in Insecticide Resistance
Total: 9 Long Term Participant Trainees			148 PMs	
156 Short Term Participant Trainees			105 PMs	

7. SUPPLY OF INSECTICIDE MALATHION

Year	No. of Metric Tons
1992	450
1993	2,450
1984	1,450
1985	3,700
1986	3,000
1987	2,400
1988	1,200
1989	1,234
1990	1,987
1991	1,700
1992	1,400

8. SUPPLY OF SPRAY PUMPS

Year	No. of Spray Pumps
1984	5,000
1988	5,000
1989	700
1990	
1991	
1992	5,200

9. SUPPLY OF NOZZLE TIPS

Year	No. of Nozzle Tips
1984	20,000
1987	20,000
1989	20,000
1991	20,000
1992	20,000

10. SUPPLY OF VEHICLES

Year	No. and Type/Make of Vehicles
1983	1 Toyota Hilux (for NIMRT)
1986	1 Land Cruiser
1989	29 Suzuki Jeeps (Hard Tops)
1989	62 Suzuki Pick-ups
1989	7 Suzuki Pick-ups (For Urban Malaria)
1990	1 Pajero
1990	3 Land Cruisers
1990	1 (one) 13-seater Commuter (For NIMRT)

11. URBAN MALARIA EQUIPMENT

Year	No. and Type of Equipment
1989	7 Heavy Duty ULV/Fogging Machines, for Municipal Corporations 700 Spray Pumps 21 Microscopes
1992	2 Heavy Duty ULV/Fogging Machines for Municipal Corporations 50 Mini ULV/Fogging Machines 400 Spray Pumps 10 Microscopes

12. SUPPLY OF DIAGNOSTIC MICROSCOPES

Year	No. of Microscopes Provided
1989	500 Microscopes for malaria microscopic and diagnostic centers at general health facilities 21 Microscopes for Municipal Corporations (For Urban Malaria)
1992	500 Microscopes for malaria microscopic and diagnostic centers at general health services facilities 10 Microscopes for Municipal Corporations (For Urban Malaria)

13. SUPPLY OF COMPUTERS

Year	Number of Computers Provided
1989	One set of IBM compatible computers, including monitors, printers and software for MSDOS, LOTUS, and DATABASE
1992	<p>Five sets of IBM compatible computers, including monitors, printers and software for MSDOS, LOTUS, DATABASE. Details of the six sets are:</p> <p>1) 4</p> <p>2) 4</p> <p>3) Equity 386SX+16 MMz 40 MB 2MB, (14) floppy for equity 4</p> <p>4) 1.44MB Floppy for equity II+/Ile/III 4</p> <p>5) Tape backup Int 40/60MB AT 4</p> <p>6) XL Series INT/EXT TBU, Controller XT 4</p> <p>7) Packard Bell, Color VGA/.31 DOT PICT 4</p> <p>8) 123 REL V3.1 5.25" HD&LD, GOV'T PACD 4</p> <p>DBase IV NCE VI.1 5.25 PCD 4</p>

14. SUPPLY OF OPERATIONAL EQUIPMENT

Year	Number & Type of Equipment
1990	<p>1 Plain Copier (Minolta) for DOMC</p> <p>1 Plain Copier (Minolta) for NIMRT</p> <p>1 Slide Projector (Kodak)</p> <p>1 Folding Screen (white cloth)</p> <p>1 Instruction Board (white plastic)</p> <p>1 Set of Flip Charts with wood stand</p>

15. SUPPLY OF FURNITURE

Year	Number and Type of Furniture
1989	3 sets of furniture for Malaria Microscopy Training Units for Punjab, NWFP and Balochistan, including 10 to 15 tables, 20 to 25 chairs/stools, demonstration boards and audio-visual materials
1990	<p>For DOMC:</p> <p>1 conference table for 20 persons, with chairs</p> <p>1 wooden table</p> <p>4 wooden bookshelves</p> <p>1 carpet</p> <p>1 set window blinds</p>
1992	1 set of furniture for Malaria Microscopy Training Unit at the office of Chief, Sindh Malaria Control Program, including 10 tables, 20 chairs/stools, chalkboard, and audio-visuals

16. WHO Technical Assistance

	Year	Number of Persons	Duration of TA
a.	1983	1	0.75 person months (PM)
b.	1984	1	0.25 PMs
c.	1985	2	1.50 PMs
d.	1987	1	1.00 PMs
e.			
f.	1990	1	0.75 PMs
g.	1991	2	1.50 PMs
h.	1992	2	2.00 PMs

17. WHO Provided Drugs

Anti Malaria Drugs	Years Supplied (In Millions)										
	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Fansidar Tablets	Nil	Nil	Nil	Nil	15M (1986)	0.9M (1987)	0.015M	Nil	0.6M (1990)	Nil	
Chloroquine Tablets			NIL	2M	-	3.5	1.99M	0.75	1M	3.2M (1991)	
Primaquin Tablets	0.197M		Nil	2M	.2M	0.99M	2M	-	.909M	.3M	.1M

18. Provided by GOP

Insecticide	1982/3	1983/4	1984/5	1985/6	1986/7	1987/8	1988/89	1989/90	1990/91	1991/92
1. 2% Fenthion Granules (MTs)	350	270	200	186	- 0 -	118.75	300	210	200	- 0 -
2. 10% Pyrethroid (Litres)	10,000	- 0 -	38,500	- 0 -	20,000	- 0 -	- 0 -	2,300-	- 0 -	- 0 -
3. Protective Clothing (Sets)	900	12,000	- 0 -	- 0 -	- 0 -	11,000	16,000	20,000	15,000	11,000
4. Rubber Gloves (Pairs)	6,000	5,000	12,000	- 0 -	7000	6,000	- 0 -	6,000	6,000	5,000
5. Anti Malaria Drugs	X	10,000	- 0 -	- 0 -	- 0 -	- 0 -	6,000	4.3M	2.779M	5.0M

19. GOP (DOMC) FUNDING BREAKDOWN (Rupees in Millions)

Province	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92
Dev. Expenditure	10.59	12.70	10.80	9.76	7.76	4.96	10.39 ^a	13.00	13.00	5.00
Non-Dev. Expenditure	0.95	1.11	1.04	0.7	1.03	1.087	1.24	1.20	1.30	1.40
NBART Allocations	-	-	-	0.87	2.5	2.85	2.12	2.00	2.10	1.25

Province	1982/83	1983/84	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91	1991/92	1992/93
Balochistan	5.84	6.14	6.46	6.79	7.14	7.40	7.86	7.80	7.90	9.84	-
Bihar	14.01	14.24	15.51	16.32	17.17	18.02	18.92	22.00	22.00	30.86	-
Punjab	31.28	34.40	37.84	41.42	45.70	48.06	50.46	52.00	53.00	54.00	-
N.W.F.P. (Only Malaria Control Program)	17.33	18.24	19.20	20.21	21.27	22.37	23.44	30.00	31.00	25.93	-

20. Urban Malaria Control

MAJOR EQUIPMENT SUPPLIED TO URBAN MALARIA PROGRAMS							
	KHI	LHE	HYD	PESH	MARD	ISL	RWP
ULV Fogging Machines	3	2	1	1	-	1	1
Suzuki PU Trucks	3	2	1	1	-	1	1
Hudson Sprayers	200	200	100	100	50	100	100
Microscopes	8	5	3	3	2	5	5
Gloves (Pairs)	500						

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