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*           PLAN OF OPERATION
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*           FOR AN
*
*   EXTENDED MALARIA ERADICATION PROGRAMME
*
*           PAKISTAN
*
*   COVERING A 5 YEARS PERIOD
*
*           1974/1975 - 1978/79
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1. LEGAL BASIS :

The Plan of Operation will be considered as an extension of the Original Plan of Operation of the Malaria Eradication Programme Pakistan (Document PAK 36C) signed by the Government of Pakistan (GOP) on 17th. July 1961 and the World Health Organization (WHO) on 5th January 1961, the contents of which will remain in force except as modified by the contents of this extended Plan of Operation.

2. OBJECTIVES:

(i) To apply a malaria eradication strategy which should conform with the 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.

(ii) 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.

(iii) 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 programme in reaching its ultimate goal of eradication.

3. FORMULATION OF MALARIA ERADICATION STRATEGY IN PAKISTAN:

During 1973, the Government of Pakistan realizing the set-backs experienced in implementing the original Plan of Operation culminating in the 1967 malaria epidemic in Karachi and the 1973 devastating epidemic that raged in Sind and Punjab Provinces decided to formulate a new strategy on which an extended Plan of Operation for malaria eradication can be developed to attain the above objectives. Various meetings were held and these together with the basic decisions taken during these meetings can be summarised in the following :

3.1. Meeting in Peshawar on 22nd. May, 1973

The Central Malaria Eradication Board under the Chairmanship of Sheikh Mohammad Rashid, Minister of Health and Social Welfare decided to establish a Strategy Committee to recommend a future strategy of malaria eradication in Pakistan.

3.2. Meeting in Islamabad on 25th. and 26th. July, 1973 :

The Strategy Committee met under the Chairmanship of Director General Health and unanimously recommended that the Malaria Eradication Programme be allowed to stay as a vertical programme for another 7 years provided that the Central Government finances the programme. It is further recommended that Malaria Eradication Programme be revised and a Plan of Operation be prepared in co-operation with WHO, other Assisting Agencies, and Provincial Health Departments.

3.3. Meeting in Karachi 18th. and 19th. September, 1973.

The Planning Team including representatives from WHO and US/AID submitted a proposed extension of malaria eradication programme in Pakistan, based on the views expressed by the Strategy Committee. This Plan envisaged the following principles :

- a. The malaria eradication programme to be continued as a vertical programme for 7 years, during which a progressive merging of the malaria personnel into the general health services is to be completed.
- b. The problem of urban malaria is to be tackled more effectively.
- c. The full participation of the general health ~~xxx~~ services in malaria eradication activities is to be intensified and accelerated..
- d. The Central Government to assist in providing the necessary supplies, transport and equipment needed by each province.

This proposed plan was agreed in principle by the representatives of 3 out of 4 Provinces. The Punjab Province; however, while agreeing to the priority to be given to anti-malaria activities, and to total coverage of the population, felt that the proposed plan based on continuation of malaria eradication programme as a vertical one for number of years did not take in consideration their present plan for acceleration of the merging of malaria personnel into the general health services.

3.4. Meeting in Islamabad 20th. October, 1973.

The Central Malaria Eradication Board under the Chairmanship of the Minister of Health, held this special meeting to discuss the future strategy of malaria eradication and the proposed extension of the Plan of Operation and decided that :-

- a. The Central Malaria Eradication Ordinance be repealed or in supercession of this Ordinance an executive order be issued by the Government of Pakistan.
- b. The quantum of present financial assistance to the Provinces will be continued. It may even be raised, if deemed necessary in order to combat the threat of malaria effectively. The Central Government will also help in securing foreign assistance for the purchase of insecticides and other equipment provided the Provinces take keen interest and concern for malaria, and produce a plan for its eradication which is technically and administratively sound.
- c. The employees of the malaria eradication programme in various Provinces be declared regular Government employees. The choice of future administrative set-up of the programme lies between a separate

department for the control of communicable diseases, or full integration of the programme with the general health services. Whatever be the choice, the administrative set-up should be competent enough to deal effectively with the malaria problem.

Following the above meeting the Provincial Government were approached to submit their views and comments on the above decisions in order to embody them in the new proposed extension plan of Operation for malaria eradication. Copies of these official letters received are attached as Annexes la, lb, lc, ld.

4. DEFECTS IN ORIGINAL PLAN AND FUTURE POLICY GUIDELINES :

The main policy guide-lines on which this Plan of Operation is based, stem from the experience gained by the Government of Pakistan during its implementation of the original Plan of Operation (1961-1973). The causes that led to the serious set-backs that occurred in the programme, give a clear indication as to the pitfalls that should be avoided in the new plan, and set forth certain policy guidelines in administering the future programme, which can be summarised in the following :

4.1. Administrative Causes :

- a. The autonomous nature of the Malaria Eradication Board did not lead to harmonious co-operation with the general health services leading to the meagre participation of the latter in this important nation-wide programme.
- b. The temporary status of employment of the malaria staff led to their demoralization, due to lack of financial security - a matter which was reflected on the quality of their performance and their high turn-over.

- c. The inadequacy of funds allocated to the programme, and certain bottle necks in releasing the obligated funds led to delays in procurement of the needed supplies and the disruption of the spraying schedule, as well as to a resort to a premature in-terruption of the spraying programme.
- d. The lack of training and orientation of the medical personnel and auxiliaries of the general health services on the principles of malaria eradication and the importance of their full participation in such a national programme, led to a rift between the malaria and health services.

4.2. Technical Causes :

- a. The development of resistance to DDT in the two main vectors A. stephensi and A. culicifacies has led to the ineffectiveness of this insecticide in interrupting malaria transmission in areas where such resistance was pronounced.
- b. The original Plan did not include other anti-mosquito <sup>measures</sup> including engineering methods, to be applied where appropriate, and hence urban malaria was neglected leading to the Karachi epidemic.
- c. No funds to meet emergency situations were envisaged in the original plan to cope with floods, or with major events leading to a sudden increase of the malarigenous potential.
- d. The lack of participation of the general health services in case detection led to the deterioration of the surveillance mechanism.
- e. The increasing resistance of the people to the DDT spraying programme, particularly after losing its original effectiveness against mosquitoes in general, was not counter-acted timely by appropriate health education methods.

2. The meagre research activities on the malaria problem related to vector resistance to insecticides, to the degree of susceptibility of malaria parasites to common anti-malaria drugs, to operational studies on the spraying equipment, or to the effectiveness of other anti-malaria measures other than residual spraying did not help in tackling the malaria problem on a more scientific basis.

5. ADMINISTRATIVE ASPECTS OF THE EXTENDED PLAN OF OPERATION

5.1. The following represent the basic administrative principles of the extended Plan of Operation.

The Ministry of Health will repeal the Malaria Eradication Board Ordinance, and substitute it by an executive order to be issued by the Government of Pakistan reflecting the objectives set forth in this extended Plan of Operation and the functions of the Central Malaria Eradication establishment in relation to its role in technical auditing, co-ordination between provinces, and with neighbouring countries and assisting agencies, overall evaluation, as well as in training and research activities. The Central Malaria Eradication establishment shall be vested with powers to ensure uniformity of operations in all the provinces. All technical decisions shall be taken under the guidance of Central Malaria establishment so that technical errors of the past are not repeated.

2.5.2. The employees of the Malaria Eradication Programme in various Provinces to be declared regular Government employees whether they will <sup>be</sup> assigned in the section for the Control of Communicable Diseases, or integrated in the general health services.

- 5.3. The Provincial Health Department will give priority to the malaria programme in their health plans, and will execute the annual Plan of Action for malaria eradication which is to be prepared and submitted by each Department to the Ministry of Health for approval. The Central Health Ministry will have powers to amend, modify or alter the annual plans if so advised by the Central Malaria Eradication establishment.
- 5.4. All facilities, transport, equipment, supplies, trained personnel and funds as listed in this plan as being essential to the success of the programme will be provided in full and in time. The present quantum of financial assistance to the Provinces will be continued, and may be raised if deemed necessary. The Ministry of Health through its Central Malaria Eradication establishment will negotiate with Assisting Agencies regarding the financing of imported supplies and equipment needed by each Province.
- 5.5. The Ministry of Health with assistance from WHO and Assisting Agencies will promote the training of key medical and auxiliary health staff on the principles of malaria eradication, and the relevant malaria functions of each category of personnel, through the organization of two weeks group educational activities to be conducted in the Public Health Institute in Lahore. The regular training of staff responsible for the execution of the anti-malaria activities will be maintained as previously done through organization of various courses, and in accordance with the needs of the programme as reflected in the annual provincial Plan of Action of malaria eradication.

5.6. As many vehicles belonging to the programme are "off road" requiring repairs, the expenditure on these drain resources, if not done in an economical way. Assisting Agencies will be requested to provide advice and guidance in the establishment of vehicle maintenance centres such as the excellent one now in existence in Lahore.

5.7. The Government of Pakistan will continue to provide the commitments as enumerated in Part IX of the original Plan of Operation, and will provide the documentation and special reports as required by the Government, WHO, and other Assisting Agencies.

5.8. The Government of Pakistan will review the extended malaria eradication programme periodically at least annually in cooperation with WHO and other Assisting Agencies, and facilitates access to all data relevant to the administrative, operational, and technical aspects of the programme with a view to assess the programme in relation to the objectives set-forth in this Plan.

6. EPIDEMIOLOGICAL ASPECTS OF THE EXTENDED PLAN OF OPERATION :

The epidemiological basis of the extended Plan of Operation is founded on the following principles :

6.1. The malarious areas in each Province have been classified under three categories related to whether the malariogenic potential in each area is high, medium or low. Such delimitation is based on cumulative epidemiological data collected from each area regarding the parasite load, vector density, water logging, climatic conditions, population movement, and factors causing man-made malaria.

Contd'./9.

The malarionogenic classification of the areas in each Province is shown in Annexure- II

- 6.2. Population movements in Pakistan involve about 2 million population. About one million population from Baluchistan migrate in the autumn (when the weather gets cold) to Sind, but return back to their villages early in the spring. The other million represents nomadic tribes that cross during the same period the borders between Afghanistan and Pakistan for grazing and as farm labourers in the various Provinces. As both mass movements can have adverse effect on the malaria situation in the areas where these migrants go, particularly if they carry a heavy load of malaria, this problem will receive due attention, particularly with regard to inter-provincial and inter-country coordination of anti-malaria activities. The Central Malaria Eradication with assistance from WHO will have great role in such coordinating activities.
- 6.3. Although the malaria vectors have two peak densities, yet the spring population shows a low parous rate indicating a low survival rate of the vectors to permit a high degree of malaria transmission. At present and following the 1973 malaria epidemic, the high rate of parasite carriers in the human population, particularly of vivax infections which relapse during the spring, will lead in presence of a high density of vector population to an appreciable degree of malaria transmission during this period. The autumnal vector population is highly parous indicating a longer span of life, hence an intensive malaria transmission season.

6.4. Since the launching of the Malaria Eradication Programme in the country, the investigations on vector susceptibility to D.D.T. have regularly been carried out by following the W.H.O. standard techniques. In the year 1969, it was observed that inspite of insecticidal spraying with D.D.T. the malaria cases did not appreciably decline in a number of areas in the various zones. This has led to detailed investigations in the following years on vector susceptibility to D.D.T. in all the provinces of Pakistan. The results of the susceptibility tests revealed that vector species have gained resistance in the major part of Punjab Sind and N.W.F.P. where as in the Province of Baluchistan, the vector resistance problem is not yet very acute. However the data for Baluchistan is limited. These entomological results have also been correlated with the epidemiological findings.

To overcome the problem of vector resistance, BHC and Malathion were considered as alternative insecticides in the resistance areas. However the results of susceptibility tests have now indicated that the vector species have gained a certain degree of resistance ~~xxx~~ also to B.H.C. in certain areas after two years spraying with the same. In such areas (with two years B.H.C. spray), the switch over to Malathion is being planned. Detailed studies on vector susceptibility to the various insecticides to be used in Malaria Eradication Programme, will be carried out regularly by applying the latest techniques as recommended by WHO throughout the country.

The detailed results of the vector susceptibility to DDT and DLD carried out in the various provinces during 1971 and 1972 are shown in Annexure-III.

and  
1973

Contd'./11.

7. FIELD OPERATIONS AND ANTI-MALARIA MEASURES :

The present high incidence of malaria all over Pakistan necessitates greater efforts by the Provinces to curb down this incidence, and bring it to a minimal level that will permit the smooth functioning of the basic health services. The latter would be progressively competent to cope with the remaining load of malaria until eradication is achieved. Insecticidal spraying will form the basis for the simultaneous protection of all population over a number of years depending on the malarionogenic potential in different areas. A spraying campaign particularly in rural areas is considered as the cheapest, and most effective way to deal with the present serious malaria problem in the country. On the other hand, other anti-malaria measures such as larviciding (particularly in urban areas), water management, source reduction, and use of larvivorous fish have to be introduced where appropriate. It is also apparent that DDT which is the cheapest and most effective insecticide, and on which hopes for complete interruption of malaria transmission were based, will soon lose its effectiveness in the areas where it is still being used, and has to be replaced by other more expensive insecticides such as HCH or Malathion, whose effectiveness in turn may last for only few years (2-3 years), before resistance of the vectors to the same will set in. Such a situation demands drastic action to be taken by the Government of Pakistan to attend to the following :-

- a. the insecticidal spraying campaign has to be organized and conducted with precision during the few years remaining, and before the local vectors become totally resistant to DDT, HCH and Malathion. When such resistance sets in, certain other

insecticides such as Propoxur and Fenitrothion may prove effective, but their cost will be quite prohibitive when used on a large scale in extensive malarious areas.

- b. the case detection mechanism has to be strengthened particularly through the involvement of all health establishments in such activity. In the meantime provision will be made to ensure an adequate number of microscopists in each district to cope with the load of slides. Needless to say both the case deduction mechanism and the laboratory services has to be under continuous supervision and checking.
- c. the distribution of anti-malaria drugs (presumptive treatment, mass anti-relapse drug administration, radical cure of cases, and mass drug administration in highly malarious localities) has to be organized to ensure the effectiveness of this ~~px~~ weapon, which in combination with residual spraying represent the main available tools in the combat of malaria.
- d. in anticipation of the time when the resistance of vectors to the insecticides in use will nullify their effectiveness, intensive studies are to be conducted on other effective and cheap anti-malaria measures such as larviciding (particularly in urban areas), and on the effectiveness of biological control through the introduction of Gambusia affinis fish in lakes, ~~x~~ swamps and rice plantations.

#### 7.1 Residual Spraying Operation.

- 7.1.1. The insecticides to be used will be malathion, HCH and DDT. Annex IV gives data on the quantities of each insecticide needed of by the various Provinces and their cost during the period 1974-79. These quantities were estimated

in accordance with the present knowledge regarding the degree of susceptibility of the local vectors to these insecticides in the various areas. During 1974-1975 campaign, the percentages of houses to be sprayed with the different insecticides in the various Provinces are :

	<u>Punjab.</u>	<u>Sind</u>	<u>NWFP</u>	<u>Baluch istan.</u>	<u>Azad Kashmir</u>
% of houses to be sprayed with DDT	10	30	10	50	100
% of houses to be sprayed with HCH	70	70	50	50	0
% of houses to be sprayed with Malathion.	20	0	40	0	0

7.1.2. The formulation and dosages to be applied of these insecticides are :

DDT (75% w.d.p) at 2 gms. (T.G.) per square meter.  
HCH (26% or 50% w.w.p.) at 0.3-0.4 gms (T.G.) per square meter.

Malathion (50% w.w.p.) at 2 gms (T.G.) per square meter.

7.1.3. The duration of the spraying programme varies with malarilogenic potential of the areas covered by the programme, (see the malarilogenic classification of areas, and population involved in various provinces in Annex -II). This duration can be summarised in the following.

- a. In areas of high malarilogenic potential
  - 3-4 years of total coverage.
  - 3 years of focal coverage (10% of total coverage).
- b. In areas of medium malarilogenic potential
  - 2 years of total coverage followed by :
  - 1 year of selective coverage (25-40% of total coverage ) and
  - 3 years of focal coverage(10% of total coverage)

c. In areas of low malarionogenic potential :-

- 1-2 years of total coverage followed by
- 1-2 years of selective coverage (25-40% of total coverage).
- 3 years of focal coverage ( 10% of the total coverage)

Any modification of such duration is to be based on sound epidemiological evaluation.

7.1.4. The timing of spraying due to climatological and topographical conditions, the two rounds of residual ~~of~~ spraying are to be scheduled as follows :

- a. In N.W.F.P., Lahore Region (north Punjab) and Baluchistan, the spraying programme is to be conducted in June-July(first round), in August-September (second round).
- b. In Sind, and Multan Region (South Punjab) the spraying programme is to be conducted :
  - in April/May (first round ).
  - in July/August (second round).

Any adjustment of the above spraying schedules should be based on sound epidemiological criteria. In the meantime, and during 1974 an assessment will be made in a pilot study area of the result obtained through one ~~round~~ round of spraying to be completed before the peak of malaria transmission in order to compare with those obtained from an area having two rounds of spraying.

7.1.5. Other essential activities related to spraying :

The updating of geographical reconnaissance, the organization of spraying teams, their training, logistics, concurrent and consecutive supervision, the maintenance of the spraying equipment and the timely change of nozzle tips, and the reporting system

have to be carefully attended to as detailed in the original Plan of Operation. Without careful planning and execution of such activities, the spraying programme which is a costly one, will fail to achieve its objective in interrupting malaria transmission.

## 7.2. Anti-Mosquito Measures in Urban Areas :

Urban malaria in Pakistan involving about 10 million population in 9 major cities and in more than 50 towns ( each with more than 20,000 population) represents a major problem. Since the Karachi epidemic of 1967 in which 600,000 malaria cases were recorded this problem has been a major concern of the public health authorities.

At present the anti-mosquito measures in urban centres have been entrusted to the municipalities in all cities and towns. In Karachi a Vector Control Board under the Deputy Commissioner of Karachi, has been responsible for the evaluation of the anti-mosquito measures conducted by the local bodies of this metropolitan city. So far such anti-mosquito measures have not been conducted on a scientific basis, and the personnel engaged lack proper training. It is for this purpose that the malaria eradication personnel in each Province will in future be more closely involved in the planning and evaluation of anti-mosquito operations as well as in training. These operations have to be co-ordinated also between the health authorities and the responsible housing and environmental engineering authorities responsible for sewage and water supply systems. The Government of Pakistan with the assistance of WHO and UNDP will promote such coordination in the planning and execution of the sewerage and water supply projects in Karachi Metropolitan Region to prevent man-made malaria caused by this extensive engineering Project. Cont. 16

The anti-malaria measures to be applied in urban areas will comprise larviciding, source reduction by dumping and drainage, as well as by periodical space spraying of Malathion in areas with high malaria incidence using ULV machines fixed on vehicles. The Central Malaria establishment will offer its assistance in preparing a manual on vector control in urban areas and in the training of the staff on the conduct of geographical reconnaissance of breeding places, application of diverse anti-mosquito measures, as well as on the proper evaluation of these operations.

The anti-malaria and anti-mosquito measures in urban areas will be carried out by Local bodies and the financial and manpower needs will be covered from their own resources. Provincial Malaria establishment will however provide technical guidance and help in training and evaluating of such activities. For big cities like Karachi, Hyderabad, Lahore, Lyallpur, Peshawar, Quetta etc. U.L.V. machines will be provided by W.H.O. Two <sup>such</sup> machines are likely to arrive this year for use in Karachi. The cost of insecticide and staff for U.L.V. machines will be borne by the respective Provincial Health Department.

### 7.3 Malaria Surveillance Operations :

The malaria surveillance operations a part from providing the necessary epidemiological tools to evaluate the effectiveness of the anti-malaria measures, and thus offer the technical guidance needed in the year to year planning, are also considered as an essential anti-malaria measure directed against the human malaria reservoir through the proper administration of anti-malaria drugs.

These operations, have been well established in the past, and the experience of malaria personnel through the years have been <sup>a</sup>great asset to the malaria eradication programme. Unfortunately these operations have been lately deteriorating for various reasons, and cannot be improved unless a drastic action is taken to introduce the necessary reforms. Now that the malaria personnel will be granted permanent civil service status, and that the Provincial Health Departments will be responsible for executing the malaria eradication activities, the Government of Pakistan will take the following steps to ensure the smooth running of these surveillance operations.

7.3.1. Active Case Detection :

This operation is to be conducted regularly on a monthly basis all the year round. Where integration is being implemented the mobile personnel of the Communicable Disease Control units, each in charge of 10,000 population will carry out this function. Where these units do not exist or sparsely distributed, the Provincial Health Departments will appoint few malaria surveillance agents to attain the full coverage required. Where integration is being progressively executed, the Health Department will maintain the force of surveillance agents in all the areas not yet covered by the integration plan. Needless to say the personnel engaged in this activity will not function properly unless the supervisory mechanism is ~~not~~ well organized on the same basis as envisaged in the original Plan of Operation.

7.3.2. Passive Case Detection :

This operation has to be intensified and properly organized, and the full participation of all medical personnel and auxiliaries of all health establishments has to be ensured. The Government of Pakistan realizing the great potential of the health establishments in contributing to the malaria surveillance mechanism will issue ministerial instructions to alter these establishments to their role in malaria case detection. At present these health establishments contribute a very negligible quantity of malaria slides inspite of the high fever rate among attendants (estimated at 30 per-cent following the recent malaria epidemics). It was also noted that the number of slides taken by surveillance agents spending one or more days in the health establishments in their areas (activated passive case detection), was very low, even when the same health establishments were reporting a very high number of clinical malaria cases. The contribution of these health establishments will be organized through the preparation and distribution of charts projecting the type of health establishment, the monthly average of new patients, and the number of slides expected monthly from each establishment estimated on the basis of a minimum of 10 per cent of the number of these patients. This rate can be adjusted annually in accordance with the malaria load among the population. The District Health Officers will be responsible to check on the records of slides collected monthly by each health establishment under his jurisdiction, to ensure an adequate and regular coverage of the population by this case detection mechanism.

7.3.3. The Laboratory Services :

These laboratories established at district (Zone) and at Provincial levels are well organized, and the force of malaria microscopists will be maintained at its present level. The logistic support to ensure the smooth flow of slides from the field, and the rapid despatch of the results ~~mf~~ to field personnel will receive high priority, in order to speed up the implementation of remedial measures. Due to the urgent need for proper maintenance of more than 2000 microscopes in use, the Government of Pakistan will negotiate with WHO regarding the granting of fellowships to two senior microscopists to attend courses organized by major microscope factories in Europe.

7.3.4. Epidemiological Investigations :

At present, and where high malaria incidence exists, these operations will be suppressed, and all efforts will be directed to improve the case detection mechanism, and increase the epidemiological knowledge of health personnel on the dynamics of malaria transmissions. Once the incidence of malaria in any zone approaches a manageable <sup>level the</sup> case and focus investigation should be instituted. The results obtained through epidemiological investigations, together with these of properly conducted case detection mechanism will provide the epidemiological data required to decide on future ~~withdrawal~~ of spraying operations.

7.3.5. Administration of Anti-Malaria Drugs :

As long as the malaria incidence is high, great care will be taken to ensure the availability of anti-malaria drugs in adequate quantities in all health establishments. Clinically diagnosed malaria cases

attending health establishments should be given doses of schizonticidal drugs (chloroquine 1500 mgms adult dose over 3 days ) to effect clinical cure. Suspected cases of malaria encountered by surveillance agents or home visitors should be given presumptive cure (600 mgm in one dose), and when the result of examination is positive, the full regimen for clinical cure ( 1500 mgms in three days) should be given to the patient.

During the period November to March inclusive and wherever feasible all the positive cases microscopically confirmed during the calendar year prior to November and since the beginning of the malaria transmission season, should be given during three consecutive monthly visits by the surveillance agents, a monthly dose of 600, mgms chloroquine plus 22.5 mgms primaquine for three days as an anti-relapse treatment. Should the load of infection is quite high such anti-relapse treatment, at proper dosages adjusted to age groups, is to be restricted to high risk groups such as infants, nursing mothers and pre-school children.

With a view to eradicate falciparum infections from Pakistan, an endeavour should be intensified to administer radical cure treatment to all P. falciparum cases, (an adult dose of 1,500 mgms chloroquine and 67.5 mgms primaquine given in divided dosages over 3 days).

The 14 days requirement of radical cure of P. vivax infections with chloroquine and primaquine will be suspended in the various districts untill malaria incidence reaches a manageable level( ie. 20-30 per thousand population). Mass chemoprophylaxis on a weekly or fortnightly basis particularly to high risk groups of infants, toddlers, and nursing mothers may

be resorted to whenever indicated particularly in epidemics with high incidence of P. falciparum. Mass radical cure can also be applied on a limited basis to eliminate malaria where interruption of malaria transmission has been attained in certain zones.

7.3.6. Entomological Operations :

The entomological staffing pattern at zonal and provincial level will be maintained. Their role in the evaluating the diversified anti-mosquito measures is essential.

The competence of the entomology staff will be greatly enhanced through their training on the epidemiology of malaria as well as on comprehensive vector measures and the evaluation of the measures.

In the presence of DDT resistance in both malaria vectors, and the impending development of resistance in the same to HCH and Malthion, entomology staff in each province have to conduct twice a year susceptibility tests in indicator villages selected in each sector, and to correlate the results obtained with the parasitological data collected through case detection activities. Spot check susceptibility test have also to be conducted in selected villages wherever a rising incidence of malaria is noted, reflecting a failure of residual spraying in interrupting malaria transmission.

Without the guidance of the experienced and well trained entomology staff in monitoring the effectiveness of the anti-mosquito measures applied or to be applied, the malaria eradication programme will prove a most expensive one, and will fail to reach its objectives.

8. HEALTH EDUCATION :

The health education programme has to be revolutionized to become an effective means to arouse the consciousness of the people to their health situation and health needs, and to involve them in all public health activities. Time has passed when the latter activities were forced on the people without their realizing the rationale of such activities.

A mammoth programme of health education involving the people, village councils, social organizations, schools etc. utilizing all media of public information, and health education techniques and tools will pay its dividends and will contribute in a great measure to the implementation of such a nation wide programme..

The development of an effective health education programme based on scientifically conducted health education surveys, and the results of pilot studies to evaluate the effectiveness of every means utilized has to be trusted to high calibre professional personnel specialized in this ~~in~~ field. With a view to develop such a programme the Government of Pakistan will seek international assistance, to obtain fully equipped health education workshops and to provide fellowships for a few carefully selected personnel. Needless to say, every malaria and health worker should contribute to the health education programme while delivering his functions, and should promote the knowledge of the people and their participation in the activities he is entrusted with.

9. TRAINING :

The training activities should be an integral function of every malaria or public health worker. These have to train the staff assigned to them, through inservice training. Such training should be a continuous process, and should be the main component of the supervisory function of each staff.

The National Malaria Eradication Training Centre (NMETC) attached to the Public Health Institute, Lahore, will continue the pre-service training of senior supervisory staff whether professional or subprofessional through the organization of regular courses properly oriented towards the revised strategy of malaria eradication in Pakistan.

With a view to increase the effectiveness of the training activities of the NMETC, this centre will be technically directed by the Central Malaria Eradication establishment, which is in a position to assess the provincial training needs, and introduce the modifications needed in the present curricula of each course to conform with the present policy.

There is an urgent need to raise the standard of training of the NMETC, and to introduce new courses related to the impending integration of the malaria personnel into the general health service. For this reason the Centre will apart from organizing special courses on epidemiology entomology, and vector control will initiate group educational activities to key medical or public health officers engaged or to be engaged in the integrated scheme. The establishment of subsidiary provincial training centres to cope with the training of junior malaria or auxiliary health staff (nurses, midwives, compounders, inspectors etc.) is to be promoted. Training abroad in the form of attending regular courses organized on an international level, or in the form of visits to gain experience on special subjects. e.g. vector control including biological control, health education, have to be restricted to carefully selected senior personnel. WHO and Assisting Agencies will help in providing such fellowships.

10. RESEARCH ACTIVITIES :

A research programme will be planned by the Central Malaria Eradication establishment, and will be oriented

Contd', .. / 24

to fill the gaps in the epidemiological and entomological knowledge related to malaria and its future eradication from Pakistan. The following activities are listed hereunder as a guide line :-

10.1! Research on malaria parasites :

- Susceptibility of P. falciparum to chloroquine.
- Relapse rate of P. vivax following 7 and 14 days regimen of chloroquine and primaquine at standard dosages.
- Induced malaria infection rate among patients receiving blood transfusion and recommendations regarding treatment of donors and storage of blood.
- Characteristics of P. falciparum in solated village in the northern temperate region of Pakistan.
- Frequency distribution of Glucose 6 PD in the population, and correlation of this with the toximanifestations incidence of following administration of primaquine at standard dosages.
- standardization of effective handling and treatment of cerebral cases of malaria.
- introduction of immuno-florescence techniques as a tool to assess residual parasitaemia in population.

10.2. Research on malaria vectors and their control.

- specification of A. stephensi, frequency distribution of the varieties, their relative infectivity rates, and DDT susceptibility status.
- role of A. subpictus under experimental and natural conditions.
- role of A. pulcherrimus and A. hyrcanus in northern region of Pakistan.
- Comparative operational cost of the application of modern larvicides that are sprayed monthly (difonphos, dursban, and fonthion) in comparison with weekly oiling.

- cost/effectiveness of biological control with fish.
- cost/effectiveness of aerial and ground spraying of malathion or iodofenphos utilizing ULV equipment.

10.3. Research on operational methodology :

- degree of efficiency of malaria case detection as conducted by multipurpose mobile health workers.
- easiest method to administer anti-malarial drugs to infants and toddlers.
- ways and means to reduce time lag between slide collection and examination, and between the latter and the start of remedial measures.
- Studies on effectiveness of modern spraying equipment.

10.4. Research on certain socio-economic aspects.

- annual per capita cost of sickness due to malaria in Pakistan.
- economic losses due to prevalence of malaria in Pakistan.
- most effective means to motivate the rural population for self help in anti-malaria activities.

11. COST OF THE PROJECT

The Provinces of Sind, NWFP and Baluchistan will continue the Programme as such till its full integration with General Health Services. All the malaria eradication activities will be carried out as usual.

The Province of Punjab will start integrating the Malaria Eradication Programme with General Health Services by creating a C.D.C. Programme by phases and the entire programme will be integrated by 1976-77. The detailed plan of integration and budgetary requirement for malaria components for the province of Punjab are annexed

COST DURING THE PERIOD 1974-75 THROUGH 1978-79 :

The estimated cost of the extended malaria eradication in Pakistan during the 5 year period of this extension to the Plan of operation is Rs.64,19,20,000.

Of this total Rs. 30,19,10,000 is required to cover internal expenditure, Salaries of National Personnel, Supplies to be bought locally, included 3871 metric ton of DDT 75% w.d.p. 2912 metric tons. of HCH (26%) w.d.p. transport maintenance and other miscellaneous expenses.

The remaining Rs.34,00,10,000 is required to defray the cost of imported supplies, including 23118 metric tons of Malathion 50% w.d.p. and 3617 M.T. of HCH(26%) for which the government of Pakistan will require the assistance of USAID.

The budget figures are shown in Annex No.V

Budget estimation have been made by the use of the following insecticide prices :-

The cost of insecticides was calculated at the rate of Rs.12,000/-M.T. (Malathion) Rs.14,000/- M.T. (HCH) and Rs.11,800/- M.T. (DDT). Thus the total cost of insecticides for all the Provinces for the period from 1974-75 to 1978-79 ~~comes~~ to Rs.41,44,50,00 as shown in this Plan.

The insecticide rates have recently further been increased to Rs.15,000/- M.T.(Malathion) Rs.15,215/M.T. (HCH) and Rs.13,450/M.T. (DDT) hence the total expenditure on insecticides will increase from Rs.41.44,50,000 to Rs.50,00,00,000 but still it is subject to change in the market rates from time to time.

contd...../27

- 6 27 1 ..  
- : C O P Y : -

ANNEX - Ia  
HC:5387-PA/73  
28-12-1973

HC: S.O. (HR)-1-3/73  
Government of the Punjab  
Health Department

Dated Lahore, the 19th. December, 1973.

From

The Secretary to Government of the  
Punjab, Health Department, Lahore.

To

The Director General Health,  
Ministry of Health & Social Welfare,  
(Health & Social Welfare Division),  
Government of Pakistan, Islamabad.

Subject :- MERGER OF MALARIA ERADICATION PROGRAMME :  
.....

Sir,

With reference to your letter No.F. 16-36/73-PH dated the 4th. December, 1973 on the subject noted above, I am directed to forward herewith Punjab Health Department comments on merger of Malaria Eradication Programme which are as follows :-

The Central Malaria Eradication Board Ordinance should immediately be repealed enabling this Department to implement Punjab Government decision on integration of Malaria Eradication Programme with the General Health Services which is being held in abeyance since long for repeal of the existing Ordinance.

Provincial Health Department likes decision of the Central Government to continue the present quantum of financial assistance to the Provinces with the reservation even to raise it. Since urban areas are to be included in the Malaria Control Programme assistance will have to be raised specially in the form of supplies of insecticides and drugs and equipment.

The Punjab Health Department has already chalked out a Plan for integration of MEP like other vertical programmes with the General Health Services invogue in the Province which will ensure a technically and administratively sound set up to control malaria in the Province. Integration of MEP with the Provincial Health Services will be the nomenclature of a new programme in which interest of employees to be integrated will be protected.

Your obedient servant,

Sd/-  
( DR. M.A.H. SIDDIQI )  
SECTION OFFICER PH  
Secretary to Govt. of the  
Punjab Health Department.

- : C O P Y : -

Appendix

GOVERNMENT OF SIND  
HEALTH AND SOCIAL WELFARE DEPARTMENT

NO. SO.VII(PH)3-18(Prov)/73

Dated, Karachi, the 8th. January, 74.

To

The Deputy Secretary, (Public Health),  
Ministry of Health and Social Welfare,  
Health and Social Welfare Division,  
ISLAMABAD.

Subject :- MERGER OF MALARIA ERADICATION PROGRAMME :

Sir,

In continuation of this department letter of even number dated 24th. December, 1973, I am directed to convey para-wise comments of the Government of Sind in response to your letter No. F. 16-36/73-PH dated 4th. December, 1973.

1. The Central Malaria Eradication Board Ordinance may be repealed and an executive order is, used in its place.

2. The quantum of Financial aid to be continued to effectively deal with the Malaria problem. The plan of action prepared by Central Malaria Eradication Board in consultation with the Provincial Chief. Sind and discussed in a meeting of the representative of Central and Provincial Government with the co-ordination of WHO/US AID may be treated as future line of action in Sind Province subject to modification in view of the existing situation in the province. The finances depicted in P.C. I form may be treated as our demand for dealing with Malaria Problem.

3. The Malaria Eradication Programme should be merged with the Health Department.

Your obedient servant,

Sd/-

Dr. Nisary Ahmad Siddiqui, DPH.  
SECTION OFFICER - VII(PH)  
FOR SECRETARY HEALTH GOVT. OF SIND

Copy forwarded to Project Director, Malaria Eradication Board, Rawalpindi for information.

THROUGH P. . . . .

GOVERNMENT OF N.W.F.P.  
HEALTH & EDUCATION DEPARTMENT

NO. S.O. II(5)/H&E/2(8)/73  
Dated Peshawar the 21st. Feb. 74.

Col. Mahboob Sadig,  
Director General Health/Dy. Director General Health  
Government of Pakistan,  
Ministry of Health & Social Welfare,  
(Health and Social Welfare Division ),  
I S L A M A B A D .

SUBJECT :- MERGER OF MALARIA ERADICATION PROGRAMME :

Sir,

In continuation of this Department letter of even number dated the 19th. February, 1974, on the above cited subject I am directed to say that this Department agrees to the extension of Malaria Eradication Programme in N.W.F.P. as laid down in the scheme for the extension of Malaria Eradication Programme in Pakistan prepared by the Committee appointed by the Central Malaria Eradication Board subject to the condition that the entire expenditure would be borne by the Federal Government.

Yours obediently,

Sd/-  
( Dr. Irshad Hussain Sethi )  
Section Officer III (T) Health

NO: S.O. III(T)/H&E/2-8/73

Dated 21-2-1974

A copy is forwarded to the :-

1. Director Health Services, N.W.F.P. Peshawar.
2. The Provincial Chief, Malaria Eradication Programme, N.W.F.P., Peshawar for information and necessary action in continuation of this Department Endorsement of even number dated the 19th. February, 1974.

Sd/-  
( Dr. Irshad Hussain Sethi )  
Section Officer III(T) Health.

FLAT

-: 29(A) :-

THROUGH P.I.A.

GOVERNMENT OF N.W.F.P.  
HEALTH & EDUCATION DEPARTMENT.

No.S.O.III(1)H&E/2-8/73

Dated:- Peshawar the 19th Feb'1974.

To:- Col. Mahboob Sadiq,  
Director General Health/Dy: Director General  
Health(PH)  
Government of Pakistan,  
Ministry of Health & S.W.,  
(Health & S.W. Division),  
Islamabad.

Subject:- MERGER OF MALARIA ERADICATION PROGRAMME.

Sir,

I am directed to refer to this Department letter of even number dated the 6th Feb & 1974 on the above cited subject and to state that it has already been intimated that the Finance Department of this Province agrees to the Provincialization of Malaria Eradication Programme subject to the condition that entire expenditure is met by the Central Government.

2. With regard to the extension of Malaria Eradication Programme in N.W.F.P. beyond June, 1974, it may be pointed out that a seven years scheme for the extension of Malaria Eradication Programme in Pakistan has been prepared by the Committee appointed by Central Malaria Eradication Board in consultation with Provincial Governments and USAID.

Yours Obediently,

Sd/xxx  
(Dr. Irshad Hussain Sethi)  
Section Officer III(T)H.

No.S.O.III(T)/H&E/2-8-/73 dated 19.2.74.

1. A copy is forwarded to the Director Health Services, NWFP, Peshawar with the request that a proposal for creation of posts for Malaria Eradication Programme, staff may please be submitted through S.N.E. for 1974-75.

2. A copy is forwarded to the Provincial Chief, Malaria Eradication Programme, NWFP, Peshawar for information.

Sd/xxxx  
(Dr. Irshad Hussain Sethi)  
Section Officer III(T)Health

NO. 5500-PH  
31-12-73

NO. 11-18/73. Health. III/7440  
GOVERNMENT OF BALUCHISTAN  
Health & Social Welfare Department  
Quetta, the 1st. December, 1973.

To.

The Deputy Director General Health,  
Government of Pakistan,  
Ministry of Health & Social Welfare,  
(Health & Social Welfare Division ),  
I S L A M A B A D .

Subject :- MERGER OF MALARIA ERADICATION PROGRAMME :

Sir,

I am directed to refer to your letter No. 16-36/73-PH, dated the 4th. December, 1973 on the subject noted above and to state that the Provincial Government is of the view that this Programme need not be retained in its present form and instead it should run as a vertical programme with its future administrative set up as to control the communicable diseases. Keeping in view the socio-economic and geo-physical conditions in the province and the general agreed opinion of the medical profession it will be in the fitness of things if a full fledged Communicable Diseases Control Department is created at a later stage in the Province. This department when created under the Provincial Government, will not only be able to effectively control the malaria menace but other communicable diseases as well.

2. Accordingly, it is suggested that :-

1. the Malaria Eradication Programme Ordinance of 1961 be repealed and an executive order, as proposed by the Central Government may be issued delegating the necessary powers to the Governors of the Provinces.
2. the Provincial Government should be responsible for meeting the expenses on the administrative set up.;
3. the financial assistance from the Centre and the aid from the foreign agencies should be guaranteed through the above proposed executive order,
4. the Malaria Eradication Programme employees be declared as regular Government servants and this should form a proviso of the above proposed executive order.

3. Since the Provincialisation of the administrative set up of the Programme will result in reduction of cost and improvement of the services, necessary action will be taken in this respect immediately after issue of the proposed executive order by the Central Government.

Your obedient servant,

Sd/-  
(Malik Abdus Samad )  
Secretary.

MALARIA ENDEMICITY :

Population expressed in thousands.

NAME OF PROVINCE	MALARIOGENIC POTENTIAL								
	HIGH			MEDIUM			LOW		
	S/S	House	Population	S/S	House	Population	S/S	House	Population
Punjab.	1614	5255120	26350	348	1029327	5391	84	229843	3941
Sind.	479	1167004	5674	39	7519339	5345	43	76943	356
N.W.F.P.	71	172422	948	391	1025802	4792	181	382196	1790
Baluchistan.	15	19966	90	119	167885	811	65	82133	385
T O T A L =	2179	6614512	33062	897	9742353	16339	373	771115	6472

\*JUST AT\*  
10-3-74.

2179  
897  
373  
3449  
17245

2  
6614512  
9742353  
2771115  
17121980

2179  
647  
373  
3449  
33062  
16337  
6472  
55873

RESULTS OF DDT AND DLD SUSCEPTIBILITY TEST ON  
VECTOR SPECIES (A. CULICIFAIES AND A. STEPHENSI)  
DURING THE YEAR 1971-72 AND 1973 :

Name of Province	No. of Zonas.	Total tests Performed	D. D. T.				D I E L D R I N			
			S	T	R	TOTAL	S	T	R	TOTAL
<u>Year 1971.</u>										
Punjab.	22	978	2	147	713	862	78	38	0	116
Sind.	6	131	27	54	50	131	-	-	-	-
N.W.F.P.	6	262	34	5	223	262	-	-	-	-
Baluchistan.	-	-	-	-	-	-	-	-	-	-
<b>T O T A L =</b>	<b>34</b>	<b>1371</b>	<b>63</b>	<b>206</b>	<b>986</b>	<b>1255</b>	<b>78</b>	<b>38</b>	<b>-</b>	<b>116</b>
<u>Year 1972</u>										
Punjab.	22	1466	9	39	212	252	1179	15	4	1198
Sind.	-	-	-	-	-	-	-	-	-	-
N.W.F.P.	8	236	14	10	46	66	148	20	2	170
Baluchistan.	2	16	4	-	6	10	4	-	2	6
<b>T O T A L =</b>	<b>32</b>	<b>1718</b>	<b>27</b>	<b>49</b>	<b>264</b>	<b>328</b>	<b>1331</b>	<b>35</b>	<b>8</b>	<b>1374</b>
<u>Year 1973</u>										
N.W.F.P.	8	228	23	4	18	45	102	32	49	183

S - Susceptible  
T - Tolerant  
R - Resistant

N.B. The result of the susceptibility tests carried out in other provinces in 1973 are under consolidation.

PROVINCE-WISE INSECTICIDAL REQUIREMENT OF MALARIA ERADICATION  
PROGRAMME DURING 1974-75 TO 1978-79

Figures expressed in metric Tons.

PROVINCES	1974-75			1975-76			1976-77			1977-78			1978-79		
	DDT	HCH	Malathion	DDT	HCH	Malathion	DDT	HCH	Malathion	DDT	HCH	Malathion	DDT	HCH	Malathion
Punjab	866	2484	3003	380	1444	6133	350	777	5000	130	20	517	150	2	434
Sind.	639	645	-	180	540	927	150	8	2172	60	-	296	-	-	151
N.W.F.P.	200	432	1200	180	-	2245	150	-	537	60	-	74	-	-	164
Baluchistan	266	115	-	60	62	149	50	-	57	-	-	29	-	-	30
<b>TOTAL.</b>	<b>1971</b>	<b>3676</b>	<b>4203</b>	<b>800</b>	<b>2046</b>	<b>9454</b>	<b>700</b>	<b>785</b>	<b>7766</b>	<b>250</b>	<b>20</b>	<b>916</b>	<b>150</b>	<b>2</b>	<b>779</b>

TOTAL

D.D.T. 75% W.D.P - 3871 M.T. (Total requirement will be met from Internal source)

B.H.C. 26% W.D.P - 6529 M.T. (Requirement will be met both from Internal & external sources)-Int 2912 M.T & ext

Malathion 50% W.D.P-23118 M.T. (Total requirement will be met from external source) 3617 M.T)

Note- The cost calculated at the rate of Rs.12000/M.T.(Malathion), Rs.14000/M.T.(HCH) and Rs.11800/M.T.(DDT).

Ashfaq/

PLAN

-: 33(A) :-

ANNEX IVA

SOURCE-WISE REQUIREMENT OF HCH 26% OF THE MALARIA ERADICATION PROGRAMME

Figures expressed in R.T.

YEAR	PUNJAB		SIND		NWFP		BALUCHISTAN		TOTAL	
	Internal	External	Internal	External	Internal	External	Internal	External	Internal	External
1974-75	363	2121	250	395	250	182	-	115	863	2813
1975-76	880	564	300	240	-	-	62	-	1242	804
1976-77	777	-	8	-	-	-	-	-	785	-
1977-78	20	-	-	-	-	-	-	-	20	-
1978-79	2	-	-	-	-	-	-	-	2	-
Total	2042	2685	558	635	250	182	62	115	2912	3617

Total Internal :- 2912

External :- 3617

Grand Total :- 6529

Ashfaq/

EXPENDITURE ON MALARIA COMPONENT FOR THE PERIOD  
FROM 1974-75 TO 1978-79

Figures expressed in million Rs.

Name of Provinces.	I T E M	1974-75		1975-76		1976-77		1977-78		1978-79	
		Internal	External								
Punjab	Administration	30.08	-	31.15	-	30.00	-	20.00	-	20.50	-
	Insecticide.	15.30	65.72	16.80	81.49	15.00	60.00	1.80	6.20	1.80	5.20
	Others Eqp.	-	2.91	-	0.75	-	0.20	-	0.20	-	0.20
Sind	Administration	6.78	-	6.99	-	7.11	-	7.45	-	7.49	-
	Insecticide	11.04	5.53	6.32	14.48	1.88	26.07	0.71	3.55	-	1.81
	Others Eqp.	-	0.96	-	0.60	-	0.60	-	0.40	-	0.40
N.W.F.P.	Administration	7.78	-	7.18	-	5.82	-	5.92	-	6.08	-
	Insecticide.	5.86	16.95	2.12	26.94	1.77	6.44	0.71	0.89	-	1.97
	Others Eqp.	-	1.26	-	0.75	-	0.19	-	0.12	-	0.06
Baluchistan	Administration	2.07	-	2.11	-	2.84	-	2.16	-	2.21	-
	Insecticide.	3.14	1.61	1.58	1.79	0.59	0.68	-	0.35	-	0.36
	Others Eqp.	-	1.40	-	0.05	-	0.05	-	0.78	-	0.10
NH.	Administration	0.60	-	0.66	-	0.69	-	0.72	-	0.75	-
	Insecticide.	-	-	-	-	-	-	-	-	-	-
	Others Eqp.	-	-	-	-	-	-	-	-	-	-
TOTAL	Administration	47.31	-	48.43	-	46.46	-	36.25	-	37.03	-
	Insecticide.	35.34	89.81	26.82	124.70	19.24	93.19	3.22	10.99	1.80	9.34
	Others Eqp.	-	6.53	-	2.15	-	1.04	-	1.50	-	0.76
	GRAND TOTAL.	178.99		202.10		159.93		51.96		48.93	

N.B. Other equipment. - Transport, Sprayers and Spare parts.

MALARIA CONTROL/ERADICATION MEASURES TO BE  
CARRIED OUT IN THE PROPOSED PLAN FOR  
PROVINCIALIZATION/INTEGRATION OF MALARIA  
ERADICATION PROGRAMME, PERTAINING WITH GENERAL  
HEALTH SERVICES :

INTRODUCTION :

Malaria has been and continues to be public health problem No. 1 in the Province. The disease has not only been taking a heavy toll of human lives but has also been responsible for hampering the success of development plans particularly in the agricultural sector. The launching of Malaria Eradication Programme had reduced the magnitude of the problem to negligible levels by 1967-68. The reverses suffered by the country have led to a dramatic come back of the disease. Had there not been an efficient organisation like Malaria Eradication Programme the effects of the epidemics of the last two years would have been devastating. There would have not only been loss of precious human lives but also a crippling effect on the national economy notably in agricultural sector.

FUTURE STRATEGY :

Therefore, it is essential that the campaign against malaria is continued with the same degree of zeal and efficiency as had been done heretofore. A dispassionate analysis of the currently available methods of malaria control reveals that indoor residual spraying is the method of choice for the control of malaria in rural areas of the Province. When supported by an efficient surveillance machinery, this method not only leads to interruption of transmission but can also prevent reintroduction of the disease.

Apart from residual spraying and surveillance, another important requirement for an effective control of malaria is the concept of total coverage. This truth has been learnt through the bitter experience of 1971 and 1973 spraying campaigns. During these two years only parts of the Province were sprayed due to shortage of insecticides.

Although this partial spray helped in reducing the quantum of transmission in the sprayed areas but the disease flared up in unsprayed villages. The partial spraying had little effect on the incidence of the disease when viewed on a province-wide basis. Therefore total coverage of the province is a must if lasting benefits are to be obtained.

To summarise, the following specific measures will be adopted for the control of malaria on total coverage basis :

1. Indoor residual spraying
2. Surveillance operations.
3. Larviciding with suitable chemicals in and around big cities, towns and town like villages.

The staff and budgetary/requirements for the malaria component of the proposed CDC Plan are based on the assumption that the above mentioned measures will be carried out throughout the Province.

PLAN OF OPERATION FOR THE MALARIA COMPONENT OF THE PROPOSED CDC PLAN :

A brief outline of the Plan of Operation for the malaria component of the proposed CDC plan is as under :-

A. SPRAYING :

Epidemiological situation in the Province demands total coverage of the rural areas for three years. This need is supported by the slide positivity rate of the last four years.

	<u>No. of slides</u>	<u>No. Positive</u>	<u>Positivity rate</u>
1970	28,27,994	85,513	3.02%
1971	25,39,944	1,71,128	6.74%
1972	30,54,043	6,22,136	20.37%
1973	29,65,733	6,12,877	20.61%

The reports and returns of hospitals and dispensaries in the Province regarding malaria morbidity further support the above data. For example over 17 lakhs cases of clinically diagnosed malaria were reported by various health institutions in the Province during 1973.

Condt'..., 37.

During the first three years total coverage of the rural areas of the Province with residual insecticides is a must according to the malariogenic potential of the various zones. Thereafter only focal spraying will be carried out as and when indicated on epidemiological grounds. It is expected that the areas for focal spray will not exceed 10-15% during subsequent years.

It may be stressed to point out that the CDC worker will be working whole time for this activity during the four months of spraying campaign so as to derive maximum benefits.

SURVEILLANCE :

An extensive surveillance machinery is already functioning under Malaria Eradication Programme in the Province. Every effort will be made to further streamline its functioning and plug the various loop holes. Here again the concept of total coverage will be implemented so as not to jeopardize the gains resulting from indoor spraying. The following activities will form the pillars of surveillance machinery :-

1. A.C.D.
2. P.C.D.
3. Epidemiological Investigation.
4. Remedial measures.

1. A.C.D.

The present system of door to door search for malaria cases will be continued throughout the Province. But it will no longer be a stereotyped operation as it has been in the past. Instead it will be a dynamic operation based upon epidemiological rather than operational considerations. It will be intensified during the periods of active transmission and when the majority of cases are likely to relapse.

Contd'.../38.

Additionally it will be utilized not only to fill the spatial gaps of P.C.D. but also to uncover the hidden cases where P.C.D arouses suspicion of transmission.

The quality and yield of ACE is going to improve considerably under the integrated set up because apart from the CDC worker who will be primarily responsible for this activity, other workers at each health unit will also search for malaria cases during their field visits. For example, the Lady Health Visitor who is visiting for MCH work will also enquire about fever amongst the occupants. The same applies to other workers of Public Health Unit and their efforts will considerably augment the work of CDC worker. Since each worker will have the broader out look of a public health worker than the narrow outlook of the present malaria worker and his contributions towards improvement of community health will have a salutary effect on public cooperation, therefore their efforts will be much more productive in terms of quality and quantity.

2. P.C.D.

The contribution of PCD has been negligible so far. Understandably this resulted from a lack of coordination between General Health Services and Malaria Eradication Programme. Since the proposed set-up of CDC will be working under the Health Department, therefore, it is expected that PCD will reach the desired high standard expected of this highly efficient system of case detection. Each and every health care institution in the Province will collect films from a certain percentage of fever cases to be specified <sup>in</sup> relation to malaria situation in each zone to ensure that no malaria case coming to them escapes detection.

Contd'.../39.

3. Epidemiological Investigation :

Epidemiological services of the proposed CDC plan will devote their attention to foci of malaria in their jurisdiction. All such foci will be investigated with the assistance of the entomology branch and appropriate remedial measures will be attended to. In addition they will continuously appraise the effectiveness of the various measures such as spraying campaigns, larviciding etc. Apart from this, they will be tackling the problem areas of persisting transmission with the help of higher echelons if necessary.

4. Remedial Measures :

Remedial measures have been listed under a separate heading so as to emphasize their importance. It is only the timely institution of appropriate remedial measures that can ensure the consolidation of the gains made. Radical treatment, focal spraying, and intensification of case detection mechanism will be the most important measures to be applied as and when indicated by epidemiological investigations.

HEALTH EDUCATION :

No disease control/eradication can hope to achieve much without the active and voluntary cooperation of the people. Until and unless the beneficiaries realise the potential usefulness of a public health programme, and exhibit their willingness to better their own lot, not much can be achieved by the efforts of public health workers however zealous and thorough they are. Therefore, due emphasis has been laid on health education. Each and every member of the proposed CDC programme will make all out efforts to elicit the cooperation of the people whom he is supposed to serve.

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BUDGETARY ESTIMATES :

The entire Malaria Eradication Programme staff in the Province will be provincialized w.e.f. 1-7-74. However, the implementation of the proposed CDC programme has been phased over a three year period for administrative and operational reasons as follows :

- 1974-75 Four Districts of Lahore Division.
- 1975-76 Eight Districts of Rawalpindi & Multar Division.
- 1976-77 Seven Districts of Sargodha and Bahawalpur Division.

The entire Province will be under the operations of the proposed CDC programme by 1976-77.

Budgetary estimates on the malaria component in both the integrated and non-integrated districts is given in the following table for next three years.

BUDGETARY ESTIMATES ON THE MALARIA COMPONENT  
IN INTEGRATED AND NON-INTEGRATED DISTRICTS  
FOR THE PERIOD FROM 1974-77 FOR PUNJAB :

Year	Source	Total cost of C.D.C. Programme	Expenditure on Malaria Component in		Total Malaria component
			Integrated Districts	Non-Integrated Districts	
1974-75 4 Distt. Integrated	Internal.	23492424	6897642	38480000	45377642
	External.	15900000	15900000	52732000	68632000
	TOTAL =	39392424	22797642	91212000	114009642
1975-76 12 Distt. Integrated	Internal.	79225842	30000000	18287500	48287500
	External.	40000000	40000000	42242000	82242000
	TOTAL =	119225842	70000000	60529500	130529500
1976-77 All Distt. Integrated	Internal.	114374049	45000000		45000000
	External.	60000000	60000000	NIL	60000000
	TOTAL =	174374049	105000000		105000000

CATEGORIES WISE BREAKUP OF ESTIMATES EXPENDITURE  
ON MALARIA COMPONENT FOR THE PERIOD FOR 1974-75  
TO 1978-79 FOR PUNJAB :

Y e a r	Source	Administration	Insecticides	Other Items.	T O T A L
1974-75	Internal	30077642	15300000	-	45377642
	External	-	65722000	2910000	68632000
	TOTAL =	30077642	81022000	2910000	114009642
1975-76	Internal.	31487500	16800000	-	48287500
	External.	-	81492000	750000	82242000
	TOTAL =	31487500	58292000	-	130529500
1976-77	Internal.	30000000	15000000	-	45000000
	External.	-	60000000	200000	60200000
	TOTAL =	30000000	75000000	200000	105200000
1977-78	Internal.	20000000	1800000	-	21800000
	External.	-	6200000	200000	6400000
	TOTAL =	20000000	8000000	200000	28200000
1978-79	Internal.	20500000	1800000	-	22300000
	External.	-	5200000	200000	5400000
	TOTAL =	20500000	7000000	200000	27700000

N.B. The expenditure on insecticides increased in the 2nd year. (1975-76) because of more use of Malathion which is costlier than others.

From a perusal of the above table, it is clear that insecticide and casual labour account for next of the budget shown under malaria component. Since regular spraying will be discontinued after 3 years, therefore the recurring expenditure on malaria component during subsequent years will amount to Rs. 2,80,00,000 annually.