WORLD HEALTH ORGANIZATION

الهيئة الصحية العالمية
المكتب الاقليمي لشرق البحر الأبيض

ORGANISATION MONDIALE DE LA SANTÉ

REGIONAL OFFICE FOR THE EASTERN MEDITERRANEAN

BUREAU RÉGIONAL DE LA MÉDITERRANÉE ORIENTALE

REGIONAL COMMITTEE FOR THE EASTERN MEDITERRANEAN

EM/RC11/4
1 June 1961

Eleventh Session

ORIGINAL : ENGLISH

Agenda item 12 (a)

MALARIA ERADICATION PROGRAMMES IN THE EASTERN MEDITERRANEAN REGION

INTRODUCTION

The malaria eradication activities of the Regional Office during the last twelve months have been mostly directed towards helping national authorities to develop comprehensive plans of operations providing for all the technical, administrative and legislative measures necessary to achieve success. There is no doubt that both governments and international agencies have gained a great deal of experience during these past years, and it is hoped that this will be of mutual benefit generally and will help in the implementation of the new plans of operations, or the addenda to those already in force. It is felt appropriate to repeat that the success of a precise programme limited in time, such as that of malaria eradication, depends on the governments' willingness to give all the necessary facilities throughout every phase. These facilities include smooth running administrative machinery, adequate financing with emphasis on adequate remuneration of personnel, intensive training activities, and continuous health education permeating all the social strata of the communities. Governments that have hitherto ignored these requisites are realizing that their programmes have to be extended for longer periods than originally planned, and this has resulted in a great deal of waste, both in money and effort.

This present document gives an account of the status of malaria eradication programmes in the Region, the accomplishments achieved, the new policies adopted regarding the future implementation of these programmes and the rôle of international agencies.

I STATUS OF MALARIA ERADICATION PROGRAMMES

1. General picture and extent of the problem

Reference is made to Table 1* which shows that this Region now comprises twenty-four countries and territories with a population of 206 millions out of which 164 million (i.e. 80%) are living under malaria risk.

It is hoped that in a few years' time the geographical group comprising six countries of this Region, namely, Iran, Iraq, Israel, Jordan, Lebanon and the UAR (Province of Syria) will declare successful eradication and thus the number of the population estimated to be under risk in this Region will be appreciably reduced.

2. Type and Status of Malaria Eradication Programmes

The status of eradication is given in Annex III.** Hereunder is a list of the countries of this Region classified according to type and status of malaria eradication programme:

(a) Countries and territories where malaria is non-existent or eradicated - Aden Colony, Cyprus, French Somaliland, Gaza Strip, Kuwait

(b) Eradication programmes - In eight countries: Iran, Iraq, Israel, Jordan, Lebanon, Libya, Pakistan, UAR (Province of Syria)

(c) Pre-eradication Surveys - UAR (Province of Egypt): Plan of operation to be signed by mid-1961 - operations starting 1962.

SAUDI ARABIA: continuing till end 1961

TUNISIA: completed but awaiting negotiations with Government regarding national financing

SUDAN: started January 1961 for one or more years

(d) Malaria eradication pilot projects - None (Ethiopia project ended January 1960 and Sudan in January 1961)

(e) Pre-eradication programmes: Ethiopia, Somalia

(f) Countries and territories with control programmes: Aden Protectorate, Bahrein, Muscat, Oman, Qatar, Trucial Oman, Yemen

II ACCOMPLISHMENTS DURING THE PERIOD JULY 1960 TO JUNE 1961

1. Planning

During this period a number of agreements for various types of malaria eradication programmes have been prepared and finalized.

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*See Annex II **See also Annual Report EM/RC11/2

Malaria eradication plans of operations were developed and signed for Iraq, Jordan, Lebanon, Libya, Pakistan, and UAR (Province of Syria). The plan of operation for UAR (Province of Egypt) has been cleared between the contracting parties and is awaiting signature.

In Iran a plan of operations signed in 1957 is valid until the end of 1961 and a plan of operations, extending the programme beyond 1961, is being currently developed and is to be finalized before the end of the present year. Israel is now developing a new plan of operations for further WHO assistance starting 1961. A plan of operations for a malaria eradication programme in Tunisia was developed during 1960, but the proposal has been deferred for the present.

Somalia - addenda to the existing plans of operations, one for the northern region and the other for the southern region, are being negotiated in order to continue antimalaria operations during 1961 until a pre-eradication programme plan of operations, combining both regions, is developed and signed before the end of this year.

Negotiations have also been underway with the Ethiopian Government for the development of a pre-eradication programme in the Blue Nile Basin. Steps are being taken to finalize the agreement by the end of 1961.

Pre-eradication survey agreements have been signed for Saudi Arabia and Sudan.

Two training centre plans of operations were signed, one establishing new training centres for Pakistan at Dacca and Lahore, and the other establishing separate status for the training centre in Ethiopia.

The Inter-Country Evaluation Project (EMRO 58) was negotiated and agreements concluded with Lebanon, UAR (Province of Syria), Jordan and Iraq. The Regional Malaria Eradication Training Centre in Cairo (EMRO 19), was provided with a second and third addenda to the plan of operations by which the scope of its activities, and the extent of WHO support, were both increased.

In all the above plans of operations developed by the national authorities with assistance from WHO, provision was made for all the requisites, administrative, financial and technical, which would ensure successful programmes.

The organizational structure at headquarters, regional, zonal, sector and sub-sector levels have been fully described. It has been realized, in some of the programmes at present in operation and which started early in 1956, that the geographical reconnaissance activities were not fully implemented and this has not contributed to the full coverage of either the spraying or the surveillance activities. For this reason intensified endeavours have been directed towards the implementation of this vital activity in all current programmes. Manuals developed by training centres and WHO sanitary engineers have been distributed and a Seminar on Geographical Reconnaissance was held during March 1961 in Iran. Emphasis has also been placed on decentralization to the lowest possible level, (Iran - bakhsh, Iraq - nahia, Pakistan - thana, etc.) serving about 50,000 to 100,000 population. This decentralization of operations follows also the eradication concept of making the chief of every sector in the country responsible for the field eradication operations in his area, and to help in better supervision and evaluation of all activities.

Malaria Eradication Boards having full administrative and financial powers are being established in both UAR (Province of Egypt) and Pakistan, to review the progress of the work and the budgetary implications as well as any administrative adjustments on regulations which have to be made to facilitate operations. Usually the Minister of Health presides over the Board and the Director of the Malaria Eradication Services acts as Secretary.

A plan of operation is regarded as a legal document of agreement between the Government and the International Agencies assisting the eradication programme; as such it has to be honoured and the commitment of each party should be fulfilled. It is obvious that any delays or omission in implementing any provisions of this plan on the part of the responsible government will defeat its purpose and lead to the withdrawal of international aid. This is the reason why legislative measures are to be enacted at the same time as the signing of the agreement to ensure the organizational provisions defining the respective functions of the Malaria Eradication Coordination Board, and the Malaria Eradication Service and assign the autonomy required to enforce cooperation and collaboration of the public, the medical profession and administrative bodies. Such legislative measures are of paramount importance and once enforced by the highest authorities in the country will overcome all the administrative and financial difficulties experienced in the past.

It is unfortunate that the countries that started their eradication programmes at an early date are realizing only now the importance of taking these legislative measures to supersede the old antimalaria laws, which still exist in many countries of the Region, and which are obsolete and incompatible with the philosophy of eradication, or with our advanced technical knowledge on the epidemiology of malaria. None of these countries has yet passed a legislative law on the compulsory notification of malaria cases without which any surveillance activity will be greatly hindered.

To ensure sound technical planning, pre-eradication surveys are carried out to delimit malarious areas, specify the vectors and the malaria transmission seasons, the timing of the spraying operations, the dosage of insecticides, the period of the attack phase as well as define the organizational structure and the financial requirements of the programme. All this is based on the epidemiology of malaria in each area as well as on the socio-economic status of the country. Moreover, it is imperative that a preparatory phase should precede the attack in order to see that the legislative measures have been enacted, and to implement pilot operations to check the soundness of the technical methods. When the attack phase is started and as technical and administrative adjustments become necessary to meet the new circumstances as they arise, experience has shown the wisdom of establishing a Malaria Eradication Advisory Committee, with the Director of the Malaria Eradication Service as Chairman, the members being advisers of International Agencies, national scientists, professors in the universities who could always guide the programme from a technical point of view, and stimulate any research that is needed to solve any technical problem.

The new plans of operation developed recently for the UAR (Province of Egypt) and Pakistan have included all the legislative measures as well as the technical requisites to ensure the success of these programmes.

The administrative regulations attached to the new comprehensive plans of operations of Jordan, Iraq and UAR (Province of Syria) will facilitate operational activities. However, in these countries the delay in drawing up a law on the compulsory notification of malaria will not contribute to a smooth running case detection operation specially as these countries, as well as Lebanon and Israel have, almost, reached the consolidation phase in many parts of the country when the protective measures are solely based on surveillance activities.

2. Training

This is a major and vital activity in any malaria eradication programme. The Regional Office, realizing the need to give adequate training to all categories of staff working in such projects and programmes, has intensified its efforts to establish training centres at national and regional levels. Two were established in Pakistan in November 1960 and the international staffing has recently been strengthened to cope with the training needs of this extensive programme.

The Training Centre in Ethiopia is still continuing its activities to provide sector chiefs as well as technicians. The new training centre to be established in Sudan by WHO and US-ICA is expected to start functioning late this year.

The Regional Malaria Eradication Training Centre in Cairo established since December 1958, has so far been fulfilling the needs of the Egyptian programme as well as those of neighbouring countries in the Region. So far it has trained, apart from 151 Egyptian trainees, 9 trainees in the senior courses and 58 trainees in the junior courses from countries other than the Egyptian Province. Lately it has been enlarged to accommodate a greater number of senior personnel for training as well as to conduct speciliazed courses such as that on entomology which was held during May/June 1961. This centre also has contributed by producing manuals on training of senior and junior personnel as well as technical documents regarding geographical reconnaissance, spraying techniques, entomological procedures, etc., for use of all countries in the Region.

The Malaria Institute in Iran is fulfilling the needs of the country and has also contributed by providing manuals of training for malaria eradication personnel. The in-service training of the personnel as well as the training of technicians, entomology assistants, squad leaders, surveillance agents, spraymenm etc., is the responsibility of the national Malaria Eradication Service.

In order to coordinate the training activities in the country the Director of the training centre is a member of the Malaria Advisory Committee which advises him on the annual needs of the programme and personnel required and adjusts the standard curricula to suit the local circumstances.

The establishment of field training areas attached to, and run by the staff of the training centre, as is the case in all the training centres in this Region,

has proved to be of great value in providing them with practical and field training in an area where the organizational structure, administrative pattern and eradication measures are representative of the malaria eradication programme of the country.

A number of senior and junior personnel (ten in all) have also been given training courses in Jamaica and Yugoslavia in order to increase their scope of experience. Fellowships are also given to teaching staff in national training centres to enable them to attend other international and regional training centres, and thus strengthen training activities.

Exchange of scientific workers is also regarded as a training activity for high senior officials in the Malaria Eradication Services. Six fellowships have been awarded this year for senior officials to visit countries where eradication programmes are in an advanced stage.

The selection of entomologists and health educators for training in their respective fields necessitates, first of all, a university degree in science or social welfare respectively, followed by a specialized course of a period of not less than one year after which they can attend a malaria eradication course to orientate them towards their future assignment. There is a need in all the countries in this Region for workers in these categories and governments are being encouraged to apply for fellowships under their WHO fellowship allocations to enable them to be given the required training before joining the short malaria eradication orientation courses.

3. Strengthening of Operational Activities

The Regional Office, following WHO policy in raising the standard of achievements in malaria eradication programmes, has met all the governments' requests by providing WHO experts in the various specialities to advise and cooperate with the national authorities in the planning, execution and evaluation of the malaria eradication programme. Table 5* shows the number and types of speciality of the international advisers including those provided by US-ICA - malariologists, entomologists, scientists, administrative officers, engineers, sanitarians, technicians. Based on the experience gained in some of the current eradication programmes of the Region, many countries undergoing eradication operations have introduced various technical reforms to strengthen their operational activities

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*See Annex II, p.vi

and to raise the standard of technique. New programmes have already provided for these reforms in their plans of operations and countries such as Pakistan and UAR have even introduced them in their initial field activities. These can be summarized as follows:-

a. During the attack phase

(1) Geographical reconnaissance, not only to locate villages, but also all other isolated rural and tribal communities, to make sketches of every village and to number all the houses, make rosters of the names of the house owners and occupants and any other relevant data to facilitate operational activities and to ascertain their appropriate implementation.

(2) The insecticidal coverage has to be totally complete, sufficient and regular - i.e. to cover all the sprayable surfaces, to apply the right dosage of insecticide, and to maintain the protective action of the insecticide during the whole transmission season through establishing proper cycles and attending to spraying of missed dwellings or those newly constructed or replastered.

(3) To ensure uniform spraying, it has been decided after intensive field trials to replace the nozzle tips every fifteen days. The number of spraymen per squad was reduced in some programmes to provide for adequate supervision.

(4) The introduction of surveillance activities even during the first year of the attack phase, especially in programmes where the vector shows a high tolerance to the insecticide applied.

(5) In hypo-endemic areas an adjustment is made regarding the reduction of the number of years of spraying during the attack phase, to one or two years, on condition that full surveillance is established in these areas. On the other hand, in hyper-endemic areas or when certain technical problems occur, the attack phase is extended to four or more years.

(6) Larviciding operations as well as drainage are resorted to, as main measures, or as supplementary ones, to residual spraying where elusive vectors occur, as in the case of A.sergenti in the Yarmuk-Jordan River and its tributaries, in UAR (Province of Syria), Israel and Jordan.

b. During the consolidation phase

(1) The criteria for starting the consolidation phase follows the recommendations of the Expert Committee on Malaria especially as defined in the Eighth

Report. Apart from the completion of interruption of transmission as shown by the zero infant parasite rate stress is made that case detection methods show also the absence of indigenous infections of recent origin throughout almost the entire area. Experience has shown also that an incidence of residual cases in the neighbourhood of 0.5 per thousand population per year is the maximum permissible level in an effective system of active and passive case detection.

(2) Detailed geographical reconnaissance and maps for every village, and for each sub-sector are requisites particularly for checking the work of a surveillance agent. Even in countries where this has not been fully accomplished before, during the attack phase, it is now becoming a rule.

(3) Special forms have been developed for personnel employed to facilitate collecting the basic data required for the standard quarterly surveillance forms used by the National Malaria Eradication Services and WHO.

(4) Decentralization of field laboratories has been effected in many countries to minimize the time lapsing between the taking of blood specimens and the reporting of the results. According to Expert Committee recommendations the government's attention is drawn to the fact that the maximum allowable limit of the interval of this lapse should not be more than three weeks in cases where a spronticidal drug is given to the suspected cases, and should not exceed three days when such a drug is not administered.

(5) Passive case detection has a very important role as a supplement to active surveillance, and the excellent results obtained in Aleppo District of the UAR (Province of Syria) where 352,000 population are covered by this system, shows the possibilities of introducing and expanding this activity in this Region. It is also a very important element in reducing the cost of the active surveillance as well as perfecting the case detection methods.

(6) Health education is considered of vital importance, especially in this phase when mosquitoes will perhaps return to their original densities and reliance for the protection of the people will be based on surveillance activities. This is the time when full cooperation of the public, civic bodies and the medical profession in detecting malaria cases is of utmost importance. The health educators will be responsible for mobilizing village leaders and voluntary collaborators to establish corps to contribute to this passive surveillance.

(7) The surveillance activities during this phase include the remedial measures which have to be taken whenever positive malaria cases are detected. Detailed epidemiological investigations must be made to determine the appropriate action to be taken in each case. The time factor here, especially during the malaria transmission season, is of vital importance in preventing the occurrence of any introduced malaria, by effective radical cure of the imported or residual malaria cases in combination with residual spraying of part or the whole village.

(8) The strength of the active surveillance activities is also maintained by an adequate number of surveillance agents, increased supervisory staff, and sufficient transportation facilities (mobilets, scooters or bicycles, etc.) as well as by carrying out mass blood surveys in villages and checking the efficiency of routine case detection.

(9) Radical cure with primaquine has not been undertaken in many countries undergoing eradication on the assumption that certain toxic effects had been observed. On the other hand its use in Iraq on an ambulatory basis and in UAR (Province of Egypt), have not shown any of these untoward effects.

c. Entomological activities

A close follow-up of entomological studies is being maintained in all countries undergoing malaria eradication. The apprehension is still felt that certain anopheline vectors, (under insecticidal pressure) can become resistant to the chlorinated hydrocarbons in use and this serves as a warning that these eradication programmes must be expedited before such resistance results. The detection of resistant strains of A.stephensi to both DDT and dieldrin in an area in southern Iran (Giroft), and to DDT in southern Iraq, Iran and Saudi Arabia have been reported. Resistance of A.fluviatilis to dieldrin has been detected in Saudi Arabia, but the same species is still susceptible to DDT and dieldrin in Iran. The resistance of A.pharoensis to dieldrin and its increasing tolerance to DDT in the Egyptian Province of UAR has been confirmed. The status of susceptibility to insecticides of the various malaria vectors in the countries of this Region where susceptibility tests were performed is shown in Table 7.*

During this period A.fluviatilis was incriminated by the Malaria Institute in Teheran as a secondary vector in south Iran (Kazeroun area). It is also apparent that this vector plays a role in malaria transmission in the eastern

*See Annex II, p.viii

province of Saudi Arabia. Other routine studies on the habits of the mosquitoes, age composition, human blood ratio, as well as bio-assay tests to determine the residual effect of insecticides, have been intensified both in Iran and in the UAR (Province of Egypt).

In Iran, A.fluviatilis has shown exophilic and exophagic tendencies; this coupled with the fact that over its range of distribution, the people have the habit of sleeping outdoors during the malaria transmission season, is proving difficult to control through routine insecticidal spraying activities. Both A.stephensi and A.superpictus still show endophilic (resting indoors) and endophagic (biting indoors) tendencies, but their human blood ratios were found to be 23% and 7.5% respectively. Bio-assay tests carried out on surfaces sprayed by an organo-phosphorous insecticide, namely malathion 1 gm per sq.m. in Borazjan (southern Iran), showed that the residual effect is of short duration, not lasting more than fifteen days on mud walls and up to thirty-five to forty days on non-sorbant surfaces.

In UAR (Province of Egypt), A.pharoensis was found to be prevalent from April to October with two peak seasons, one in May and the other in September. Its indoor density was reported higher in May and June than during the rest of its season of prevalence. This vector bites both outdoors and indoors, but its outdoor resting habits especially in rice fields and the finding of comparatively high human blood ratio among the mosquitoes collected from these rice fields (17.8%), coupled with the fact that this mosquito has a long range of flight (up to 150 kms.) make it necessary to keep a very close watch on the timing, dosages and cycles of the residual spraying programme and its evaluation, especially as the bio-assay tests and survival rates so far carried out have proved that the dosage of 2 gm. DDT per sq.m. applied to mud walls does not last more than a maximum of three months.

To strengthen the WHO advisory services in malaria eradication programmes and direct these to enable the epidemiologist to have adequate entomological assistance in evaluating the eradication measures applied and guidance in establishing a year to year technical strategy, a reorientation course was organized by WHO for entomologists from this Region as well as from other Regions. This was held at the Regional Malaria Eradication Training Centre at Cairo from 29 April to 15 June 1961. Following this course, a manual is being prepared for

the use of entomologists, defining their rôle in malaria eradication programmes, describing the modern procedures and techniques applied in the field, and how to interpret the results obtained to serve the epidemiologist in his overall evaluation of the programme.

d. Reporting and Statistics

Emphasis has been placed during this period on the development of reporting systems by all categories of personnel working in malaria eradication. WHO has contributed by issuing a manual for Reporting Procedures and Records (EUR-TURKEY 23, 1960), which has been distributed to all projects and which can be used as a guide and reference in developing the forms required. In extensive programmes, such as the one in Iran, courses have been given to train assistant statisticians attached to each Shahrestan, in the routine computational work entailed in filling in the various forms for provincial and headquarters' reference. Courses on statistics were given in all the training centres to help malaria workers to use statistical techniques in connexion with the planning, execution and evaluation of the eradication programmes. A manual on Statistical Considerations and Methodology in Malaria Eradication (WHO/Mal.240, 1959) has been widely circulated.

4. Coordination activities

a) Within the country

Although the Malaria Eradication Service is given a special status in the Ministry of Health in order to execute the field operations without delay, this Service is nonetheless an integral part of the public health structure of the country and it has to rely for its success on the cooperation of the medical profession especially during the consolidation phase, to detect and eliminate any residual foci of parasitaemia or any indigenous or imported cases of malaria. It is due to this that legislative action regarding compulsory notification of malaria cases by the entire medical profession including laboratories, pharmacists, etc., is of the utmost importance. Malaria Eradication Boards as well as Advisory Committees attached to the Malaria Eradication Services, are established to coordinate efforts within the country, not only of the other departments of the Ministry of Public Health, but also of the various ministries including Defence, Agriculture, Public Works, Education and Interior. No country can afford to spend so much money and effort in eradicating malaria without organizing the public health set-up that will maintain the freedom of the country from this disease. In an eradication programme carried out by stages, priorities have to

be set for the development of rural health units in areas which will be the first to reach the maintenance phase of malaria eradication. Some of the experienced malaria eradication personnel can be absorbed into the rural health units. It is considered necessary too that after the liquidation of the Malaria Eradication Service, a Malaria Eradication Sentinel Section be established within the Epidemiology Department of the Ministry of Health; this section to be responsible for the follow-up of any malaria incidence in the country, as well as in neighbouring countries, and advising the authorities on the quarantine measures which have to be taken to prevent the importation of infected persons or mosquitoes as well as giving technical advice on measures for eliminating any sporadic focus of malaria.

b) Inter-Country

The importance of inter-country agreements has already been stressed. During this period the Ethiopia/Sudan inter-country coordination agreement has been implemented and a meeting took place in May 1961 between National Malaria Services, to discuss frontier malaria problems.

Iraq and Iran are now negotiating an agreement on exchange of information on the malaria incidence and the eradication measures taken in the villages along a strip of land averaging ten kilometres on each side of the border.

Coordination along the borders between the countries where the Inter-country Malaria Evaluation Team (EMRO 58) is working, is activated and arrangements for regular meetings between the directors of these services are being made.

5. Research

Research activities on technical problems in malaria eradication have been stimulated and pursued. The report on nomadism in Ethiopia, Sudan and Somalia by a short-term consultant was submitted during this period, and has stimulated further studies specially in Somalia which faces possibly the gravest nomadic problem in the Region. In Iran studies on the use of medicated salt among tribes are being carried out with very promising results. In this connexion the "Guide-Lines for the Use of Medical Salt (Pinotti's Method) in Malaria Eradication" (WHO/MEM/1), has been given wide circulation in the countries of this Region, in order to draw the attention of National Malaria Eradication Services to the possibilities of applying this method in certain areas.

Studies are pursued also in Iran on the use of organo-phosphorous compounds and their residual effect especially in areas where double resistance to chlorinated hydrocarbons has occurred in the local vector. Although the results with Malathion, 1 grm/sq.metre, (as carried out in Giroft area in Iran), are not promising, as the resiudal effect does not last more than fifteen days on mud walls and not more than thirty days on non-absorbant surfaces, both in UAR (Province of Egypt) and in Iran, there exist facilities for more applied research on any new insecticides or residual fumigants that require testing in the field. Other studies on the dosage of DDT applied to walls are being undertaken as it has been found in certain countries that 1 gm./sq.m. instead of 2 gm./sq.m. will give the protection required. Although experience shows that the 2 gm. dosage is still considered essential especially when the sorption of mud walls, and the high tolerance of certain vectors to DDT are taken into consideration yet, in certain areas, this dosage reduction will result in considerable savings on the DDT supplies especially where a large number of the population is involved or when two or more spraying cycles have to be undertaken each year. Plans for conducting such trials in some of the countries have already been circulated.

WHO has encouraged studies on the costs of the surveillance operations which will result in more realistic financial planning of the surveillance operations. This will also stimulate the governments to intensify the passive surveillance activities which will certainly, apart from raising the standard of efficiency in detecting malaria cases, effect also certain savings by adjusting the active surveillance operations accordingly.

III NEW POLICIES

1. World Health Organization

a) Technical

It has been realized that a new approach to malaria eradication has to be made to suit the conditions existing in developing countries. These countries do not usually have the necessary foundations for this kind of closely coordinated, thorough, and time limited activity. To ensure the success of malaria eradication consideration must at the beginning be given to:

(1) social structure including nomadism,

(2) the educational status including the availability of personnel for training and staffing of the service,

(3) the economic conditions that would allow the financing of the programme sufficiently over its duration,

(4) the administrative system allowing the possibility of creating a malaria eradication organization that would deploy the skills and the resources,

(5) a communication system that will make it possible to reach quickly all the areas under operation,

(6) and, last but not least, to a health organization which will ensure the effective implementation of the consolidation and maintenance phases of the eradication programme.

In these countries too, the technical feasibility of a malaria programme has to be ascertained by pilot operations in selected areas to study the various epidemiological conditions and find ways and means to interrupt malaria transmission. For this reason WHO realizing that many developing countries are anxious to undertake malaria eradication, has approved a new policy to assist these countries to develop "Pre-eradication Programmes" with the objective of helping them to make up for any deficiency which exists thus making future programmes technically, administratively, financially and practically feasible.

In this Region, two pre-eradication programmes are being developed, one in the Blue Nile Basin in Ethiopia, and the other in Somalia. In the Blue Nile Basin of Ethiopia where little is known about the epidemiological conditions of malaria, and the rugged terrain as well as the sparse distribution and shifting habits of the population, coupled with the fact that the rural health service is only now being developed, a programme of this nature will help greatly. In the meantime, US-ICA is also assisting an eradication programme in stages in the whole territory around this Basin, and it is hoped that the results and recommendations of this pre-eradication programme will be available in time to tie in this area with the overall eradication programme.

In the case of Somalia, the 1961 operations are concentrating on a plan of operations for a pre-eradication programme to start in 1962. The epidemiological features of malaria in this country are affected by the extensive nomadic population, almost constituting two thirds of the total population. The health authorities during the last five years have been

conducting spraying operations, and certain benefits and experience have thereby been gained. The operations have lately been decentralized to six zones, and the training of auxiliary personnel has been actively pursued for the last three years. The government realizes the importance of malaria eradication in its overall economic development programme, and it is hoped that its cooperative attitude in providing all the facilities within its power will help in making this pre-eradication programme a prelude to an eradication programme involving the whole country.

Following the Resolution* of the Thirteenth World Health Assembly on the establishment of a register at headquarters for all the areas where malaria has been eradicated after being certified by a WHO Evaluation Team, WHO has asked governments undergoing malaria eradication to submit every quarter on WHO standard forms data on the number of source of malaria cases detected by the surveillance activities in the consolidation phase. It is gratifying to note the readiness of the governments undergoing eradication in this Region to submit these reports, which are of value to the directors of the Malaria Eradication Services in keeping them informed regularly about the status of disappearing malaria and to warn them in time about any deficiency that needs rectifying.

b) Financial

The Fourteenth World Health Assembly, in an attempt to make the maximum and most rational use of the resources placed at the disposal of the world malaria eradication programmes, to achieve final success as soon as possible, and to maintain financial assistance on more solid grounds, approved** the gradual incorporation of the provisions for all malaria eradication activities in the Regular Budget of the Organization as from 1962. In order to give guarantees to contributing governments that these funds will be used in the most rational manner, the Fourteenth World Health Assembly recommended that in those countries where satisfactory progress is being made and which have sufficient trained personnel, the possibility of reducing WHO technical advisory assistance is to be studied by the respective Regional Committees for the benefit of those whose programmes have not yet started or are in their initial stages, as well as to make available equipment and supplies particularly drugs for use in the consolidation phase.

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*WHA.13 **Doc.EM/RC11/14, p.2

The Fourteenth World Health Assembly also expressed its conviction that voluntary contributions would be essential to the success of the programmes* in order to:

(a) maintain the programme and to provide additional resources to enable more rapid and broader execution of the programme; and

(b) to provide funds for the payment of credits to those countries eligible under the criteria established by Resolution WHA 14.15.

Thus the WHO Director-General was requested to continue his efforts to obtain voluntary contributions from all possible sources including governments, voluntary health organizations, foundations, industries, labour organizations, institutes and individuals.

To raise more funds for the world battle against malaria, the Fourteenth World Health Assembly, following a recommendation by the WHO Executive Board** has invited Member States to issue malaria eradication stamps which will also help spread information and stimulate interest in this greatest international enterprise in the field of health ever undertaken. It offers national health administrations an opportunity to raise additional funds for their malaria eradication programmes. Libya, Iran, Jordan, Kuwait, Pakistan, Sudan, Tunisia and the United Arab Republic have already announced their intention to issue such stamps.

2. UNICEF

UNICEF has been assisting many countries in this Region with their eradication programmes, by providing imported supplies including vehicles, insecticides, sprayers, drugs and laboratory equipment. From their annual US$10 million ceiling for malaria aid, UNICEF's allocations to Eastern Mediterranean Region programmes, during 1960 and 1961 totalled $3,193,000 (see Table 4).*** The countries which receive current UNICEF support in malaria eradication include Iran, Iraq, UAR (Provinces of Egypt and Syria), Lebanon, Jordan, and Somalia. The policy of UNICEF on future aid to malaria eradication programmes will de decided at the June 1961 UNICEF Executive Board.

UNICEF Regional Directors during programme discussions at UNICEF headquarters, New York, in January 1961, expressed the urgent need for a factual evaluation of each malaria eradication programme at the end of the

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*EM/RC11/14, p.4 **EM/RC11/14, p.7 ***Annex II, p.v

fourth year of operations and at the end of each subsequent year, together with a detailed year to year plan of action to be annexed to each recommendation for any malaria eradication programme. The following text has been proposed to be included in all plans of operations to cover this evaluation activity. The objective of such evaluation will be to ascertain that:

(a) "the campaign is being conducted under technically adequate conditions and effective steps have been taken to resolve any administrative and organizational problems related to the conduct of operations."

(b) "the chances for eradication appear good at least for a large part of the country; the technical problems encountered are not of a nature for which no solution can be found, and evaluation services are organized in such a way that precise information on the development of the campaign can be supplied regularly every year."

3. US - International Cooperation Administration

A report including recommendations of the US-ICA Expert Panel on Malaria dated 1 August 1960, was presented at the WHO/US-ICA Coordination Meeting held in Cairo during November 1960. Although the recommendations do not represent the decisions or the stated policy of US-ICA, yet the trends on the future US-ICA policy as far as it concerns this Region, can be summarized as follows:-

(a) US-ICA to consider support for additional country eradication projects in response to the clear initiative of national governments especially in countries with large populations such as Pakistan, and giving preference to countries adjacent to those where eradication projects are in progress.

(b) US-ICA to give separate consideration to Tropical Africa by cooperating intimately with WHO in planning eradication for Africa as a single programme; and that US-ICA take the initiative without prejudicing malaria eradication elsewhere possibly by creating an African malaria fund and seeking the participation of other nations.

(c) US-ICA to provide funds for expanded research in epidemiology, surveillance, entomology, insect resistance, dosage and cycles of application of insecticides, chemotherapy, persistant fumigants and such other problems as may emerge in the course of eradication.

(d) US-ICA to insist on early and continued epidemiological evaluation of eradication projects in which it participates and be prepared to withdraw its support from projects where failure to register a reasonable progress can be contributed to the lack of government support or inadequacy of administrative control.

US-ICA is currently supporting the eradication programmes in Iran, by providing three scientists to help in studies on the strengthening of the geographical reconnaissance procedures, and in research on resistant and elusive malaria vectors. In both the Libyan and Jordan programmes, US-ICA is helping by providing supplies as well as advisory services (one scientist in each of these programmes). In Ethiopia, US-ICA has provided four scientists as well as most of the imported supplies. Negotiations are also proceeding for the establishment of a Training Centre in Sudan, to be assisted by both US-ICA and WHO.

The commitments of US-ICA in the various eradication programmes in this Region, as well as the number of advisory personnel provided by this Agency, are shown in Tables 4 and 5 respectively.*

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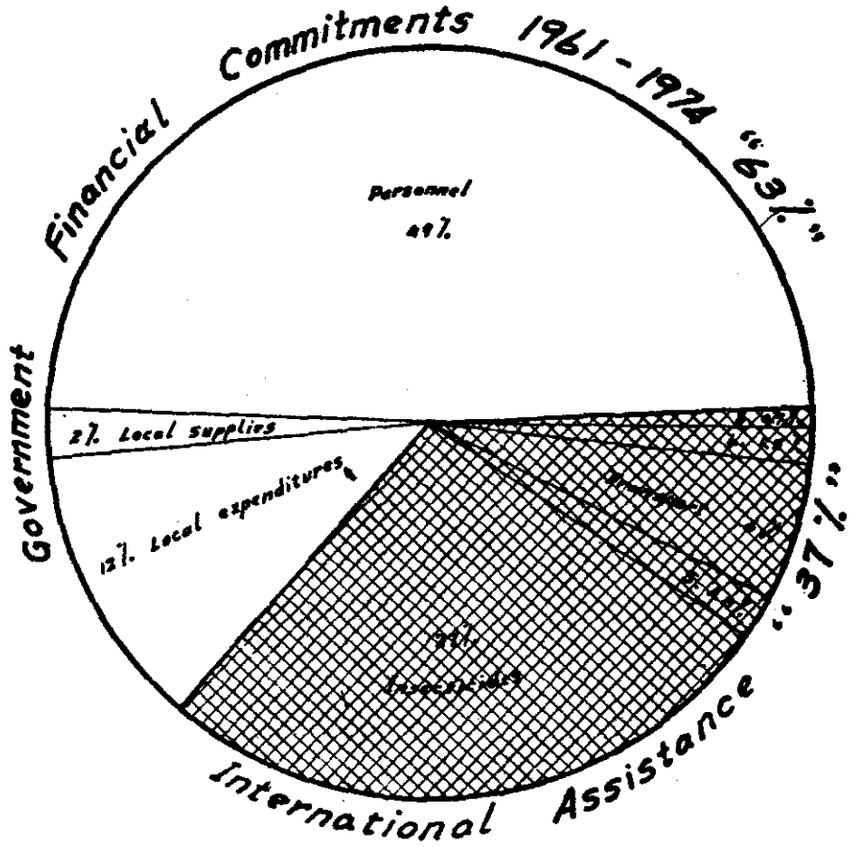
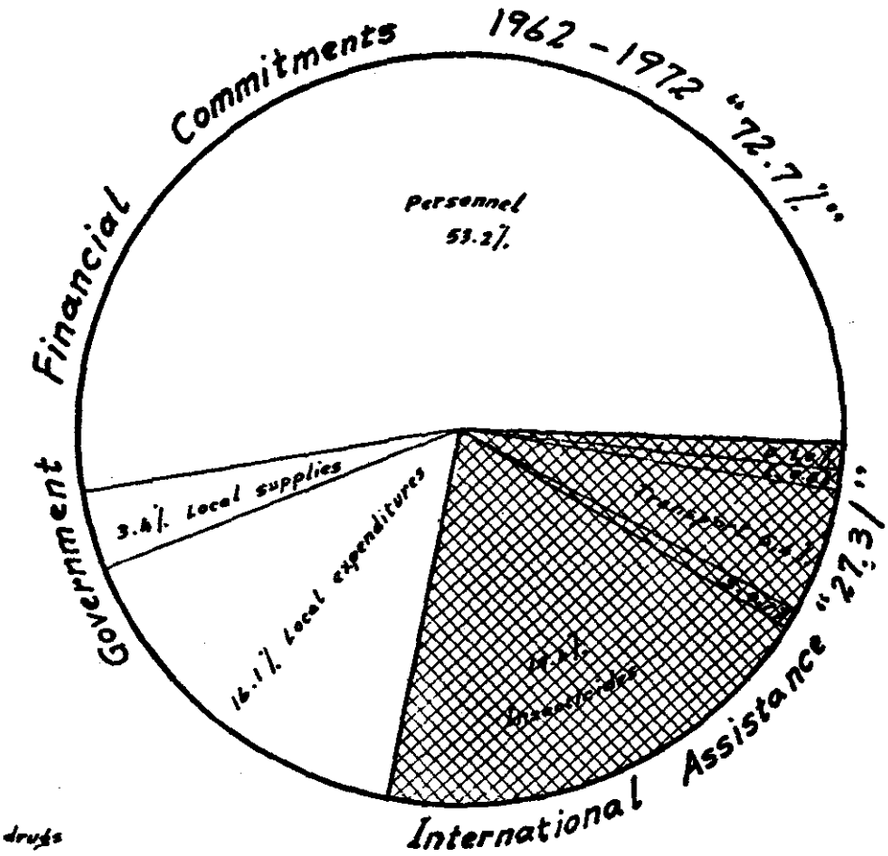
* See Annex II, pages v & vi.

ANNEX I

RATIO OF PLANNED BUDGETARY EXPENDITURES ON VARIOUS ITEMS IN MALARIA ERADICATION PROGRAMMES RELATED TO THE TOTAL BUDGET



PAKISTAN



D. Anti-malaria drugs
S. Spraying equipment
L. Laboratory equipment

U.A.R. (EGYPT)

ANNEX II

TABLE 1

STATUS AND DEVELOPMENT OF MALARIA PROGRAMMES 1960

TYPE OF PROGRAMME	COUNTRY	Total no. of popul.	Popul. under malaria risk	Popul. protected by all methods	ERADICATION		
					Commencement of attack	Completeness of attack	Type
Eradication	IRAN	21,000,000	13,000,000	10,068,400	1957	1971	by stages
	IRAQ	6,500,000	4,514,000	4,514,000	1957	1964	country wide
	ISRAEL	2,140,000	2,140,000	2,140,000	1950	1963	" "
	JORDAN	1,506,860	787,000	780,000	1959	1965	" "
	LEBANON	1,627,586	683,000	683,000	1956	1964	" "
	LIBYA	1,340,000	31,000	31,000	1960	1963	" "
	PAKISTAN	90,000,000	87,128,000	4,367,144	1961	1974	by stages
	TUNISIA	3,783,000	1,914,000	1,914,000	1962	1972	" "
	U.A.R. (Egypt)	26,080,000	18,355,000	5,443,000	1962	1972	" "
	U.A.R. (Syria)	4,561,000	1,570,196	1,349,644	1956	1964	country wide
TOTAL		158,538,446	130,122,196	31,290,188			
Pre-eradication programme	ETHIOPIA	20,000,000	10,000,000	400,000	1961	1973	by stages
	SOMALIA	1,980,000	1,776,000	247,500	1963	1970	" "
TOTAL		21,980,000	11,776,000	647,500			
Pre-eradication survey	SAUDI ARABIA	7,000,000	5,000,000	522,300	1961	1972	by stages
	SUDAN	11,390,000	11,390,000	4,035,275	1963	1972	" "
TOTAL		18,390,000	16,390,000	4,557,575			
Control	ADEN	800,000	660,000	-			
	BAHREIN	137,853	137,853	137,853			
	QATAR	40,000	35,000	-			
	T.STATES	85,000	85,000	-			
	YEMEN	4,500,000	3,500,000	-			
TOTAL		5,562,853	4,417,853	137,853			
Eradicated normally free	ADEN COL.	138,400	138,400	138,400	Malaria eradicated since 1950		
	CYPRUS	550,000	550,000	550,000	" " since 1949		
	FR.SOMAL.	67,500	67,500	67,500	" " since 1957		
	GAZA STRIP	337,000	337,000	337,000	" " since 1954		
	KUWAIT	207,000	-	-	Free from malaria		
TOTAL		1,299,900	1,092,900	1,092,900			
GRAND TOTAL		205,771,199	163,798,949	37,726,016			

ANNEX II

TABLE 2

PROGRESS OF MALARIA ERADICATION

COUNTRIES	TOTAL POPULATION	No. of population under malaria risk	1960 ACTIVITIES				1961 ACTIVITIES			
			Population protected by				Population protected by			
			Spraying	Larviciding	Consolid.	Total	Spraying	Larviciding	Consolid.	Total
IRAN	21,000,000	13,000,000	5,868,400	-	4,200,000	10,068,400	5,080,000	-	6,620,000	11,700,000
IRAQ	6,500,000	4,514,000	2,779,000	-	1,735,000	4,514,000	1,694,000	-	2,820,000	4,514,000
ISRAEL	2,140,000	2,140,000	53,072	2,140,000	2,140,000	2,140,000	53,000	2,140,000	2,140,000	2,140,000
JORDAN	1,506,860	787,000	106,000	260,000	520,000	780,000	107,500	267,000	520,000	787,000
LEBANON	1,627,586	683,000	29,196	-	653,804	683,000	30,000	-	683,000	683,000
LIBYA	1,340,000	31,000	12,247	31,000	-	31,000	31,000	31,000	-	31,000
PAKISTAN	90,000,000	87,128,000	-	-	-	-	1,300,000	-	-	1,300,000
U.A.R. (Egypt)	26,080,000	18,355,000	331,000	-	-	331,000	649,000	-	-	649,000
U.A.R. (Syria)	4,561,000	1,570,196	1,092,736	3,200	253,708	1,349,644	579,925	3,200	990,271	1,570,196
TUNISIA	3,783,000	1,914,000	Pre-eradication survey completed, but implementation awaiting Government's decision							
TOTAL	158,538,446	130,122,196	10,271,651	2,434,200	9,502,512	19,897,044	9,524,425	2,441,200	13,773,271	23,374,196

ANNEX II

TABLE 3

STATUS OF SPRAYING AND LARVICIDING OPERATION, 1960

COUNTRY	No. of squads		No. of population protected by		Insecticides (spray)				Larvicides	
	Spray.	Larvic.	Spraying	Larviciding	Type	Formula	Wall dosage g/m²	Amount (MT)	Name	Amount
ETHIOPIA	42	-	400,000	-	DDT	75% w.	2.0	42	-	-
IRAN	368	-	5,868,400	-	DDT BHC DLD	75% w. 50% 50% w.	2.0 0.5 0.5	116? 1 38	-	-
IRAQ	551	-	2,779,000	-	DDT DLD	75% w. 50% w.	2.0 0.6	548 101	-	-
ISRAEL		17	53,072	2,140,000	DDT	50% w.	2.0		Malariol + solar	400,000 L.
JORDAN	8	40	106,000	260,000	DDT	75% w.	2.0	18.9	Solar oil + pure resin + DDT T.G.	521 L. 12.5 kg 2.8 kg
LEBANON	9	-	29,196	-	DDT DLD BHC	75% w. 50% w. 50% w.	2.0 0.6 1.4	2.9 8.0 6.0	-	-
LIBYA	2		12,247	31,000	DDT	75% w.	2.0	1.4	Tossit DDT 75%	500 40 kg
PAKISTAN			3,280,449	3,145,592	DDT	Tech. w.	2.0		Malariol	

TABLE 3 (Cont.)

COUNTRY	No. of squads		No. of population protected by		Insecticides (spray)				Larvicides	
	Spray.	Larvic.	Spraying	Larviciding	Type	Formula	Wall dosage g/m^2	Amount (MT)	Name	Amount
SAUDI ARABIA	5	12	197,300	325,000	DDT DDT DLD DLD	75% w. 28% e. 50% w. 18% e.	2.75 3.54 0.85 0.70	2.3 1.4 5.6 0.5	K.R Larvicides	 37
SUDAN	54	-	4,035,275	-	DDT DDT DLD	Tech. 75% w. 58% w.	2.0 2.0 0.6	 17.2 7.7	-	-
SOMALIA	17	-	247,500	-	DDT	75% w.	2.0		-	-
TUNISIA	-	-	-	-	-	-	-	-	-	-
U.A.R. (Egypt)	32	398	331,000	5,112,000	DDT DDT DDT	50% w. 75% w. 100%	 2.0	149.3 9.6 0.3	Malariol Mal + DDT 5% Solar Solar + Octacler	646 189 150 79
U.A.R. (Syria)	82		1,092,736	3,200	DDT DDT	75% w. 25% e.	2.0 2.0	195 59,000 liters	Paris green	35

ANNEX II

TABLE 4

FUNDS ALLOCATED TO ANTI-MALARIA PROGRAMMES
IN U.S. $

Countries	1960					1961				
	Government	WHO	UNICEF	ICA	TOTAL	Government	WHO	UNICEF	ICA	TOTAL
Ethiopia	187,500	66,590	-	457,100	711,190	386,070	56,760	-	750,400	1,193,230
Iran	3,600,000	124,802	968,000	85,000	4,777,802	5,067,000	147,525	827,000	109,830	6,151,355
Iraq	2,205,000	81,165	228,000	-	2,514,165	2,800,000	76,180	242,000	-	3,118,180
Israel	252,780	6,000	-	-	258,780	252,780	3,000	-	-	255,780
Jordan	260,580	43,175	19,000	150,400	473,155	298,200	47,150	30,000		375,350
Lebanon	83,340	14,040	5,000	-	102,380	127,000	24,200	9,000	-	160,200
Libya	3,000	8,700	-	55,000	66,700	49,800	13,330	-	*	63,130
Pakistan	840,000	185,880	-	-	1,025,880	1,890,000	485,400	-	-	2,375,400
S. Arabia	888,900	34,930	-	-	923,830	1,333,000	51,700	-	-	1,384,700
Somalia	116,135	63,465	37,500	-	217,100	181,330	77,275	39,500	-	298,105
Sudan	330,000	36,000	31,500	-	397,500	368,000	63,000	56,000	-	487,000
Tunisia	40,000	40,500	-	-	80,500	40,000	12,360	-	-	52,360
U.A.R. (Egypt)	1,500,000	24,800	-	-	1,524,800	1,500,000	31,600	310,000	-	1,841,600
U.A.R. (Syria)	198,900	50,530	227,000	-	476,430	321,700	56,230	163,500	-	541,430
TOTAL	10,506,135	780,577	1,516,000	747,500	13,550,212	14,614,880	1,145,710	1,677,000	860,230	18,297,820

* ICA contribution is included in government commitment

ANNEX II

TABLE 5

MALARIA ERADICATION PROGRAMME

1960/61

International Advisory Services

Countries		Malar.	Eng.	Entomol.	Scient.	Sanit.	Tech.	Ad.off.	S.T.C.	Total
Ethiopia	WHO	1	-	1	-	1	1	-	-	4
	ICA	1	1	-	4	-	-	1	-	7
Iran	WHO	1	1	-	-	-	-	1	-	3
	ICA	-	-	-	3	-	-	-	-	3
Iraq	WHO	3	-	1	-	1	-	1	-	6
Israel	WHO	-	-	-	-	-	-	-	1	1
Jordan	WHO	1	1	1	-	1	-	-	-	4
	ICA	-	-	-	1	-	-	-	-	1
Lebanon	WHO	1	-	-	-	-	(1)	-	-	2
Libya	WHO	-	-	-	-	-	(1)	-	1	2
	ICA	-	-	-	1	-	-	-	-	1
Pakistan	WHO	3	1	2	-	2	2	2	3	15
S.Arabia	WHO	1	-	1	-	1	-	-	-	3
Somalia	WHO	1	-	2	-	1	1	-	-	5
Sudan	WHO	1	-	1	-	1	-	-	-	3
Tunisia	WHO	1	-	1	-	1	-	-	-	3
UAR (Egypt)	WHO	1	-	-	-	-	-	1	-	2
UAR (Syria)	WHO	1	-	-	-	2	-	1	-	4
EMRO 19	WHO	-	1	1	-	-	1	-	1	4
EMRO 58	WHO	1	-	-	1	-	1	-	-	3
T O T A L		18	5	11	10	11	8	7	6	76

( ) Posts provided for in the budget but not yet filled.

ANNEX II

TABLE 6

NATIONAL MALARIA PERSONNEL, 1960

Countries	Permanent	all year round	Seasonal	Physic.	Entomol.	San. Eng.	Other Profes.	Lab. Tech.	Surv. Agents	Field Sup.	Drivers	Spraymen	Adminis.	Others	TOTAL
Ethiopia	1	170	175	-	-	-	-	8	23	52	41	168	39	15	346
Iran	105	3015	3500	49	15	16	25	151	1157	265	590	3500	372	480	6620
Iraq	41	900	3804	2	3	-	6	30	310	41	204	2206	68	1965	4835
Israel	-	57	275	17	1	-	2	60	11	17	17	180	2	25	332
Jordan	2	127	371	2	1	-	2	17	25	17	35	40	28	333	500
Lebanon	9	28	70	-	-	1	1	6	20	2	15	36	8	18	107
Libya	11	-	10	-	-	-	-	3	-	4	4	10	-	-	21
Pakistan	113	447	788	22	27	-	35	41	13	109	96	788	29	188	1348
S. Arabia	176	20	180	3	2	2	-	11	-	12	18	88	16	224	376
Somalia	31	14	115	-	-	-	2	4	16	10	20	80	3	25	160
Sudan *	8	63	320	1	1	-	6	1	18	15	17	313	3	16	391
Tunisia	-	283	-	-	-	-	-	-	269	14	-	-	-	-	283
U.A.R. (Egypt)	763	57	180	25	-	31	1	45	1	437	57	160	81	162	1000
U.A.R. (Syria)	3	189	854	3	2	1	10	24	25	149	53	700	18	61	1046
T O T A L	1263	5460	10642	124	52	51	90	401	1888	1144	1167	8269	667	3512	17365

* For the pilot project only.

ANNEX II

TABLE 7

STATUS OF SUSCEPTIBILITY TO INSECTICIDES AMONG

MALARIA VECTORS

As reported in 1960

Countries	Species	Reaction to DDT		Reaction to DLD	
		No.of Areas tested	Result	No.of Areas tested	Result
Ethiopia	A.funestus	1	Sus.	1	Sus.
	A.gambiae	11	Sus.	11	Sus.
	A.pharoensis	2	Sus.	2	Sus.
Iran	A.fluviatilis	8	Sus.	4	Sus.
	A.maculipennis	2	Sus.	2	Sus.
	A.stephensi	9	Sus.	9	res.
		12	Int.	12	res.
		1	res.	1	res.
Iraq	A.stephensi	2	res.	2	sus.
Israel	A.pharoensis			1	res.
Jordan	A.sergenti	1	sus.		
Pakistan West	A.stephensi	2	Sus.		
	A.culicifacies	4	Sus.	1	Sus.
	A.fluviatilis	1	Sus.	1	Sus.
	A.subpictus	1	Res.		
Saudi Arabia	A.fluviatilis	1	Sus.	1	Res.
	A.gambiae	1	Sus.	1	Sus.
	A.multicolor	1	Sus.	1	Sus.
	A.stephensi	1	Res.	1	Sus.
	A.superpictus	1	Sus.	1	Sus.
	A.sergenti	2	Sus.	2	Sus.
Somalia	A.funestus	1	Sus.	1	Sus.
	A.gambiae	2	Sus.		
Sudan	A.gambiae			2	Sus.
	A.pharoensis	1	Sus.	1	Res.
U.A.R. (Egypt)	A.pharoensis	10	Int.	10	Res.
U.A.R. (Syria)	A.sacharovi	4	Sus.	4	Sus.

ANNEX III

REVIEW OF MALARIA ERADICATION PROGRAMMES IN THE EASTERN MEDITERRANEAN COUNTRIES

E T H I O P I A

I SUMMARY OF ACTIVITIES IN 1960

Of a total of 10 million persons under malaria risk in Ethiopia, 400,000 were protected during 1960 by DDT residual spraying. The population protected are in four pilot project areas: Kobo-Chercher, Dembia plain, Gambella and Nazareth. The latter also includes the field training area of the Malaria Eradication Training Centre, established in 1959 with assistance from WHO. Some fifty sub-professional malaria field and laboratory workers were trained by the Centre in 1960.

During the year a Department of Malaria Eradication under a Director-General was formed by an Imperial Decree which also provided the department with all the needed administrative and legislative requirements.

Susceptibility tests carried out have proved that all the principal vectors, namely A.gambiae, A.funestus and A.pharoensis are susceptible to DDT and Dieldrin.

II PLAN OF ACTION FOR 1961

The first year of an extensive anti-malaria programme will start in 1961 and is planned to protect 800,000 persons by means of residual spraying with DDT. It is intended to develop a malaria eradication programme with the help of ICA extending over a period of thirteen years (1961 - 1973), covering, by stages, the entire malarious area of the country which is already divided into seventeen zones and ninety-six sectors. The total expenditures are estimated at Eth. $64,159,700 (U.S. $26,733,000). The per capita cost approximates Eth. $6.4 (U.S. $2.6).

As the Blue Nile Basin has not yet been surveyed and, owing to its peculiar topography and epidemiological features, WHO has proposed to implement a pre-eradication programme in that area to start early in 1962, in order to advise on the most suitable eradication measures to be applied in the area, and the necessary pre-requisites (in rural health centres, communication facilities, etc.) needed to prepare this area for inclusion in the country-wide malaria eradication programme.

I R A N

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

The year 1960 was the fourth year of Malaria Eradication and the tenth year of the large scale anti-malaria operations in the country. During this year insecticidal coverage reached its peak; 60% of all villages with a population of 5.868 million were sprayed. Of this figure 2.46 million were in the northern responsive zone and the remaining in the southern problem zone.

DDT 75% WW was used for the protection of 86% of the population under spraying. In the southern zone Dieldrin 50% WW was also applied in DDT-resistant A.stephensi areas.

The coverage in some Ostans reached the target while in others it fell short by 10%. Delays also occurred in the start and progress of operations causing extension of spraying beyond the period planned and within the malaria transmission season.

(2) Consolidation Phase

During 1960, consolidation phase through active surveillance covered 4.2 million inhabitants of which only 8% were in the southern problem zone and the remaining in the northern responsive zone.

Routine operations are centered at Shahrestan level where 1157 surveillance agents and 260 sector chiefs are assigned. Laboratory services are available only at each Shahrestan centre, and epidemiological investigations are carried out by the Ostan epidemiologists.

Passive surveillance was initiated in Azarbayjan, Gilan, Mazanderan with considerable success. About 1600 volunteers contributed to the collection of slides from their own localities.

II EPIDEMIOLOGICAL EVALUATION

Surveillance activities carried out in the attack phase covered 5.1 million population (87% of the total under attack). The number of slides collected in these areas was 246,311 out of which 2098 positive cases were found.

Under the consolidation phase where 4.2 million population are covered, 219,162 slides were collected out of which 358 positives were confirmed. There is one surveillance agent approximately for every 7,787 persons. Analysis of surveillance activities in Ostans 3 and 4 which are under consolidation showed that an average only of 70% population were visited each month, with a maximum of 87%. There exist seventy-one laboratories now (one at Headquarters, eleven in Ostans, fifty in Shahrestans and nine in the field) with approximately 114 microscopists.

The three main vectors in the northern responsive zone namely A.maculipennis, A.sacharovi, A.superpictus, are all susceptible to DDT and Dieldrin. A.stephensi is highly tolerant to DDT and resistant to Dieldrin. A.fluviatilis, which is also prevalent in the south, is susceptible to both DDT and Dieldrin. No susceptibility test has so far been carried out in the case of A.culicifacies which is the predominant vector species in the south eastern part of the country.

III PLAN OF ACTION 1961

During 1961 attack operations will cover 28,560 villages throughout the country. This figure, compared with that of 1960, shows 20% reduction in spraying coverage. The reduction will mostly take place in Ostans 1, 3 and 4 where almost 50% of the villages, under attack in 1960, will enter consolidation during 1961.

Consolidation phase during 1961 will cover 14,650 villages where spraying has been discontinued, against 11,362 villages in 1960. In addition, 3,452 villages considered originally clean where no spraying has ever been carried out, will be kept under surveillance in consolidation phase.

Field experimental studies on insecticide field trials, medicated salt and field operation methodology will continue in the seven experimental projects in the south.

IV BUDGET AND COSTING

Government budgetary requirements are estimated to amount to $ 5,067,000 during 1961, an increase of 29% over 1960. The Government will finance

the local cost of operations and part of insecticide requirements while UNICEF is providing all other imported supplies and transport estimated at $827,000, The WHO contribution to the programme during 1961 will be $147,500.

V FUTURE PLANS AND PROSPECTS

During 1961 the whole responsive zone, with approximately 7.5 million population originally under malaria risk, will be covered by eradication measures. Already some two million persons in about 10,000 villages are free from malaria and can enter the maintenance phase, but in the absence of adequately expanded rural health services, the Malaria Eradication Organization continues its routine surveillance operations in these villages.

The prospects in the southern problem zone are not, however, so bright. A number of problems such as nomadism, vector resistance to chlorinated hydrocarbon insecticides, as well as other local conditions have caused considerable delays in implementing a full-scale eradication programme. However, intensified studies and field experiments have been under way for several years at the Institute of Parasitology and Malariology and certain promising results have already been obtained regarding the strategy of implementing the eradication programme in this zone.

I R A Q

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

Spraying operations protected 2.8 million population during the first round (applying DDT at 2 gms.Tech/sq.metre in the northern two regions, and Dieldrin at 0.6 grams/sq.metre in the southern region).

The first round of spraying was delayed by four to five weeks, with the result that only one half of the population was protected before the new transmission season started. Although the spraying man-power was doubled, still 912 villages were left unprotected when the spraying was concluded. These were, however, covered in the second round.

The second round covered 1.164 million persons in the southern-most liwa, part of the two adjacent liwas, and in certain areas in the other liwas where a longer transmission season exists.

Supplementary spraying in the form of summer hut spraying, and autumn spraying of replastered and newly built houses were also carried out. Moreover, in the upper and lower Zab river, an emergency spraying team was formed to roam over the area once monthly to spray bedouin tents or other temporary structures

Active surveillance during the attack phase extended to cover 2.615 million population.

(2) Consolidation Phase

By 1960, the fourth year of eradication operations in the country, already most of the central region and some nahias in the northern and southern regions (1,735,000 persons) were in the consolidation phase with no other field operations except for surveillance. However, this coverage was at no time complete or timed on regular schedule. Population coverage in any month was below 50% throughout the year; a 58% coverage was only reached during December.

II EPIDEMILOGICAL EVALUATION

In areas covered by surveillance activities in the attack phase (2,6 million) out of 198,510 slides collected, 880 were found positive (P.vivax 635, P.falciparum 194 and P.malariae 51). The ratio of slides collected to the population covered in this phase during 1960 is estimated at 70‰.

In the consolidation phase, covering 1.735 million population, a total number of 51,760 slides was collected and their examination showed twenty-seven positive cases (24 P.vivax and 3 P.falciparum). The ratio of slides examined per thousand population during 1960 is estimated at 38. The number of surveillance agents in the consolidation phase is distributed at the rate of one surveillance agent per 11,000 population. There are three laboratories, one at headquarters and two at provincial level, in which are engaged sixty-one microscopists.

A.stephensi which is the predominant species in the south, developed resistance to DDT in 1957. However, contrary to the findings in Iran, it has remained susceptible to Dieldrin. No resistance has so far been observed in A.sacharovi, A.fluviatilis or A.superpictus.

III PLAN OF ACTION FOR 1961

The year 1961 is marked with country-wide surveillance operations. The total 4.514 million population under risk are now covered by a full and complete surveillance scheme. Of this population 2.820 million are in consolidation and only 1.694 million will still receive spraying protection.

Laboratory services are expanded and further decentralized to the fourteen liwas and, in some instances, to nahia level to cut short the distance between the field and laboratory and to speed up examination of slides.

IV BUDGET AND COSTING

Government budgetary requirements for local expenses are estimated at I.D. 500,000 (US $1,400,,000). UNICEF contributed $242,000 in imported supplies and equipment.

V FUTURE PROSPECTS

During 1961 already 62% of the total population under risk are in the consolidation phase and only 38% are still receiving protection also by spraying.

During 1962 a further reduction of 13% in the attack phase coverage is expected, extending the consolidation phase to 75% of the total population under risk.

It is anticipated that by 1963 almost the entire country will be in the consolidation phase and in 1965 malaria can be declared eradicated from the country.

Certain legislative actions and intensified health education measures regarding the detection and notification of malaria cases and their radical cure should be carried out. Coordination of the activities in Malaria Eradication Service and the General Health Services should be started and stressed so that the latter can take charge of the future maintenance phase.

I S R A E L

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

Although it is presumed that the country has been in the consolidation phase for the last few years, yet, large-scale anti-larval measures are continued at the same rate as before.

During 1960, larval control operations provided protection to the entire 2.140 million population of the country through the use of Solar oil or Malariol alone, and in rare instances mixed with DDT 0.5 - 1%.

During 1960, DDT spraying covered some 66 villages with 53,000 inhabitants mainly in the Hule Valley, Jordan Valley, Berth Valley stream and in the Dead Sea area. Three cycles of spraying were applied, each preceding the season of prevalence of the three known vectors. The dosage used is 2 grams/sq.m. in a 5% DDT solution.

(2) Consolidation Phase

The entire 2.14 million population of Israel has been under passive case detection for the past few years. This method, although has not resulted todate in a satisfactory coverage (Number inhabitants visited to total in 1960 is 0.7%) yet it has great potentialities for expansion and effective case detection.

There is a considerable number of hospitals and dispensaries throughout the country and an average of one doctor for every 400 inhabitants. There exist also a total of 129 provincial, central and hospital laboratories which can contribute to the examination of greater numbers of slides than already taken.

Active case detection applies only to malaria patients and their contacts as well as to special groups of population such as immigrants, visitors from Africa or Asia, bedouins, sailors and inhabitants of certain villages in the border areas.

II EPIDEMIOLOGICAL EVALUATION

During 1960, out of 28,413 slides examined, seventy-four were found positive.

Passive case detection covering total population collected 15,183 slides (0.7% of total population) and twenty-two were found positive. Active surveillance collected 18,036 slides from the groups previously mentioned and the result of examination of 13,452 slides showed fifty-two positive cases, including twenty-two asymptomatic carriers.

Epidemiological investigations carried out on the positive cases detected by active and passive surveillance showed thirteen indigenous cases.

As a result of susceptibility tests carried out, it was found that A.pharoensis which presumably invaded certain coastal towns late in 1958 from neighbouring territories is resistant to Dieldrin. No susceptibility

test has so far been carried out on other vectors namely A.sacharovi, A.sergenti, A.superpictus, A.claviger.

III PLAN OF ACTION FOR 1961

It is planned to intensify collection of blood slides from all fever cases by hospitals, dispensaries and medical professions, in order to ensure a wider coverage.

This, together with following up of cases, proper treatment of positively confirmed cases and appropriate epidemiological investigation, would contribute to an efficient and satisfactory surveillance operation.

Larval control operations as well as DDT spraying are likely to continue during 1961 as an anti-mosquito measure.

IV BUDGET AND COSTING

The National Malaria Eradication Service has an annual budget of I.£.400,000 ($222,220) for its routine anti-malaria operations (larval control and spraying). In addition, an extra budget of I.£.55,000 is provided for malaria eradication activities (mainly active surveillance). The total annual budget of I.£.455,000 ($252,780) represents 0.9% of the Ministry of Health budget. The annual cost per capita for anti-malaria operations amounts to I.£.0.21 ($0.12).

V FUTURE PLANS AND PROSPECTS

As indicated by the present case finding methods, malaria in Israel is on the verge of complete elimination. The present large-scale anti-mosquito measures can thus be reduced and any savings thus made can be utilized to strengthen and expand the activities for detection and elimination of present foci of infection so that complete eradication could be completed within the next two-three years.

J O R D A N

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

DDT spraying was conducted in two rounds in the Jordan Valley and in Kerak lowlands covering 73,000 persons whilst in the highlands of East Jordan only one round was carried out covering 33,200 persons.

Weekly repetitive larviciding of all breeding places constitutes the main attack measure in the lowlands where A.sergenti is the principal vector. All the breeding places are treated with solar oil at a dosage of 5 cc per square meter. During the summer months, however, 2% DDT was added to the solar oil to compensate for the breakdown of oil due to heat. In remote areas, residual larviciding was applied at monthly intervals with 5% DDT solution in solar oil at 10 cc per square meter.

To help in the elimination of vast breeding places in Kerak lowlands some 275 hectares of land were dried up through drainage during the year and taken over immediately by settlers who kept the channels and ditches maintained and conditioned during the year. The cost per hectare of reclaimed land to Malaria Service is about JD 9 while the price for a hectare of land averages about JD 1,000. This explains the rapid take-over of land by the population.

(2) Consolidation Phase

West Jordan as well as refugee camps in the Jordan Valley entered the first year of consolidation, as all the attack measures were stopped and surveillance activities were strengthened to provide complete coverage of 520,000 population under risk. Passive surveillance was also developed in this region with assistance from community development workers, school teachers, nurses and other public health workers as well as from hospitals and private practitioners. Laboratory services were increased by assignment of additional technicians and establishment of sub-center laboratories.

II EPIDEMIOLOGICAL EVALUATION

During 1960, the surveillance activities in the consolidation phase collected 20,708 slides out of which ninety-eight were found positive (69 P.vivax, 23 P.falciparum, 6 P.malariae). Epidemiological investigations were carried out on all positive cases and it was found that these cases are either old infections or imported from other areas still under the attack phase, as well as from neighbouring countries (e.g. Saudi Arabia).

The number of population covered by one surveillance agent per month is estimated at 21,000.

All P.vivax and P.malariae cases were hospitalized and given a radical cure course of Primaquine over a fourteen-day period. There exist four laboratories in the country (one at Headquarters and three in the Field) with fifteen microscopists.

The ratio of slides collected during 1960 is 40 per 1000 population which shows that the surveillance coverage was still incomplete.

Apart from A.sergenti whose larvae showed resistance to Dieldrin in one area, no resistance has so far been found to either Dieldrin or DDT. A.superpictus and A.claviger have not been tested for susceptibility to DDT or DLD.

III PLAN OF ACTION FOR 1961

Spraying operations will continue as in 1960 in two rounds in Jordan Valley and in the lowlands and in one round in the highlands of East Jordan.

In 1961 surveillance operations in the consolidation phase areas of West Jordan and the Valley will be further strengthened, the number of surveillance agents and field supervisors will be increased, a greater number of transport will be employed, and additional sub-center laboratories will be organized. This, together with the completion of geographical reconnaissance, will ensure a tighter check on operational activities. In addition, the Jordan Valley with 70,000 population, as well as Irbid district of East Jordan with 78,000 persons, will undergo surveillance operations in addition to usual attack measures.

During 1961 operations, compression sprayers will replace the old hand-flit guns as the former proved to be more efficient and twice as economical in labour cost. Solar oil will be substituted by malariol with and without DDT which will avoid any wastage of labour in mixing and distribution.

IV BUDGET AND COSTING

Total expenses of the malaria eradication programme in 1961 are estimated at JD 117,200 ($328,200) of which JD 10,714 ($30,000) will be paid by UNICEF for the procurement of insecticides, transport, microscopes, anti-malarial drugs and spraying pumps, and the remaining JD 106,500 ($298,200) will be borne by the Government.

V FUTURE PLANS AND PROSPECTS

Already 66% of the population under risk in Jordan are in the consolidation phase with good prospects of moving into the maintenance phase in 1963.

Spraying and larviciding operations will be discontinued in 1962 in the Jordan Valley and Irbid district of East Jordan thus increasing the population under consolidation in 1962 to 84% of the total under risk.

The remaining 16% are expected to enter consolidation phase in 1963. The conclusion of the programme can thus be expected in 1965.

L E B A N O N

I SUMMARY OF ACTIVITIES IN 1960

Spraying operations carried out annually since 1953 as well as minor larviciding operations have successfully brought down the incidence of malaria to a negligible level so much so that during the last three years no single specimen of A.sacharovi, once an important vector, was found. Accordingly, attack measures have been confined to small localised areas.

During 1960 only 29,196 persons in the suspected villages were protected by spraying. A system of surveillance was, however, in operation during the last few years. In 1960 four mobile teams of four technicians each, and twenty regional surveillance agents made weekly tours of villages and collected blood slides from fever and suspected cases, as well as from infants and school children. These slides were brought back or dispatched to the Headquarters in Beirut for examination. Once a positive case was found, investigations were made into the nature of the case and, if necessary, into the local conditions and local vectors. Positive cases were also followed up in the successive months and were given anti-malaria drugs.

II EPIDEMIOLOGICAL EVALUATION

Although by the end of 1960 surveillance operations covered the majority of the villages under risk, only a limited number of them received regular monthly visits. These surveillance activities collected 38,100 slides, out of which 12 positives were found (P.vivax 11, P.malariae 1).

The ratio of slides examined per thousand population during 1960 was about twenty-three. The number of surveillance agents is rather low as there were only twenty agents to cover the whole population under risk (683,000), i.e. 34,650 population per surveillance agent.

Except for A.claviger which has shown resistance to DDT, the other vectors, namely A.superpictus and A.sacharovi, have remained susceptible to both Dieldrin and DDT. A.sacharovi seems to have been almost eliminated from the country since 1956 in both its adult and larval stages. During 1958 only three specimens and in 1960 only one were found in spite of the regular search in the majority of villages.

III PLAN OF ACTION FOR 1961

During 1961 active surveillance is covering all 683,000 persons living in previously malarious areas at regular monthly intervals. The country has been divided into four districts and, at the centre of each, a malaria

office as well as a laboratory are established. Surveillance agents, seventy-five in number, will visit the villages in their sectors mostly by Mobilets. Some will use public means of transport and few will use the Malaria Service vehicles. Provisions are also made for spraying of villages where local transmission may be detected. (Estimated at 30,000 persons).

IV BUDGET AND COSTING

Cost to Government for the 1961 operations is estimated at $127,000, which has already received parliamentary approval. UNICEF has also contributed $9,000 to the cost of Mobilets, microscopes and drugs.

V FUTURE PLANS AND PROSPECTS

It is expected that by 1964, after three years of consolidation, there will be sufficient evidence confirming the present claim that malaria has almost been eradicated from this country.

L I B Y A

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

The second year of total coverage with DDT at the rate of 2 grs/sq.m. was completed in April and May in the thirty-one villages at Fezzan district. In addition, larviciding with tossits (DDT and lindane) or DDT - oiling of all breeding places, was carried out.

(2) Consolidation Phase

This phase is due to start in 1962. In anticipation, however, surveillance activities will start from the month of May after the completion of 1961 spraying operations.

II EPIDEMIOLOGICAL EVALUATION

Of the total 3,270 blood slides collected through malariometric surveys during 1960, twelve or 0.361 per cent were found positive of which nine were P.falciparum and three P.vivax. The ratio of slides collected during 1960 to the population under risk is 106 per thousand. No susceptibility tests have so far been carried out on A.sergenti or A.multicolor, the two principal vectors.

III PLAN OF ACTION FOR 1961

A National Director has been appointed to head the Malaria Eradication Service. An ICA scientist is taking charge of the technical guidance of the programme. DDT spraying will be repeated at the same rate and scale

as in 1960 for the third year. Larviciding operations will, however, be intensified to cover all the breeding places on a more regular schedule. It is also planned to use 5% DDT solution in fuel oil as the larvicide during the year.

IV BUDGET AND COSTING

The total cost of the programme during 1960 amounted to $66,700. This programme receives assistance from ICA.

The annual cost per capita of the eradication campaign is estimated at $2.15.

V FUTURE PLANS AND PROSPECTS

It is expected to start the consolidation phase in 1962 after the completion of three years of attack operations. The malaria problem is a localised one in Libya, involving about 31,000 people living under risk. No technical problem so far has been encountered, and completion of eradication is expected by 1964.

PAKISTAN

I SUMMARY OF ACTIVITIES IN 1960

The year was spent mostly in sample surveying of various provinces in both wings and in collection and compilation of necessary data for preparation of the comprehensive Plan of Operations.

The plan, which was finalized in November, involves 87.1 million population and an expenditure of $109 million. It extends over fourteen years covering by stages the entire malarious areas.

For field training of personnel, the Sheikhupura district in West Pakistan, with a population of 250,000, was subjected to eradication operations. After a thorough geographical reconnaissance of the area, DDT spraying at 1 g/sq.m. in two successive cycles was applied.

It has been established that A.culicifacies and A.fluviatilis are susceptible to DDT and Dieldrin. A.stephensi proved to be susceptible to DDT. No susceptibility test has been carried out on A.minimus, A.sundaicus and A.philippinensis.

II ADMINISTRATIVE ASPECTS

The malaria eradication programme is operated by an autonomous decentralized organization and directed by an Executive Public Health Administrator.

The National Malaria Eradication Headquarters as well as the Provincial and Regional Offices will have a number of personnel whose functions will be mainly to advise Zone organizations on general operational policies and to exercise overall supervision of eradication activities. As a part of their duties, these Offices will assemble and finalize the year to year Plans of Action, will procure and distribute supplies and equipment, and will exert direct supervision of administrative and financial activities.

Zone Offices are independant operational Units involving an average of one million population in West Pakistan and 1.5 million in East Pakistan. Each Zone has four separate functional divisions including field operations, evaluation, administration and health education, all working under the supervision of the chief of the zone. There is an average of sixty-two staff members attached to each; to this should be added thirty permanent and 560 seasonal workers belonging to the ten Sectors operating under each zone.

Sixteen vehicles are provided at each zone for transportation and supervisory activities. Of these, ten Dodge Power Wagons are assigned - one to each Sector and the other six light vehicles are assigned to the Zone Office.

III PLAN OF ACTION FOR 1961

(1) Attack Phase

During 1961, DDT spraying will protect one million persons in Sheikhupura district in West Pakistan, and 0.3 million in Dinajpur district of East Pakistan. In West Pakistan a low DDT dosage of 1 gr./sq.m. will be applied in two successive rounds while in East Pakistan 2 grs./sq.m. in one cycle will be used. Surveillance activities are planned to start from the first year of attack and will contribute to the assessment of the efficiency of field operations.

(2) Consolidation Phase

The consolidation phase is expected to begin in West Pakistan after four years of continuous attack while in East Pakistan, due to low endemicity, it will start from the fourth year.

It may be possible that in hypoendemic areas of East Pakistan, the consolidation phase will start even earlier.

IV BUDGET AND COSTING

The total programme expenditure is estimated at $109 million. Of this $40 million (37%) approximately are the cost of imported supplies and

transport and the remaining will be local costs. Personnel costs account for almost half of the programme's expenditure (49%), insecticides constitute 74% of all imported requirements, or 27% of the total cost. (See ANNEX No.I). The cost per capita for the eradication of malaria during the fourteen-year programme is estimated at $1.20.

SAUDI ARABIA

I SUMMARY OF ACTIVITIES IN 1960

During 1960 the pre-eradication survey covered the entire country with the exception of the northern section of Najd and the areas lying north and south of the two oases of Qustif and Al Hassa. The results so far achieved indicate that apart from the pilgrimage area which is under control operation (ex WHO Pilot Project) the entire coastal plain on the west is malarious. The endemicity, however, was found to be highest in Tihama Asir and Tihama Gizan in the southern part with two main vectors namely A.gambiae and A.sergenti, while in the northern portion endemicity is comparatively lower and confined to small oases, far apart, where A.sergenti is the main vector (average S.R. 8.8% - average P.R. 5.8%).

The Higaz escarpment which begins from the Gulf of Akaba in the north extending southward to Yemen, was found either uninhabited or free from malaria.

In the central plateau, east of Higaz mountain range, malaria is localized with endemicity varying significantly from place to place. A.gambiae, A.sergenti and A.stephensi were found to be the principal vectors in the area.

In the eastern province where systematic anti-malaria operations have been carried outduring the last few years, transmission has now been completely stopped in Al Hassa oasis and consequently the area is under consolidation, while in Quatif Oasis resumption of transmission has occurred due to shifting habits of the population and also to the existence of exophilic malaria vectors.

Susceptibility tests carried out so far have shown that except for A.fluviatilis which is resistant to Dieldrin and A.stephensi which is resistant to DDT, the other principal vectors, namely A.gambiae, A.superpictus, A.sergenti are all susceptible to both DDT and Dieldrin.

II PLAN OF ACTION FOR 1961

The Government has already decided to convert present malaria control operations to a malaria eradication programme. A new malaria station has been established in Sikaka and Medina and attack phase measures are planned to start in 1961.

For this purpose the budget of the National Malaria Service for 1961 operations has been increased from S.A. rls 4 mil. in 1960 ($888,900) to S.A. rls 6 mil. ($1,333,000).

S O M A L I A

I SUMMARY OF ACTIVITIES IN 1960

DDT spraying in the northern region covered the settlements of 50,000 nomads on the border of Ethiopia.

In the southern region, two rounds of spraying were applied in the riverain areas to cover 75,600 persons in the first round and 197,500 in the second round. The coverage was deficient in both cycles; 33% in the first cycle "Gilal", and 83% in the second "Hagai". Malathion at 100 mg. per sq.m. and BHC at 200 mg/sq.m. (Technical) were also used in heavily bed-bu infested areas mainly to overcome the inhabitants' resistance to DDT spraying.

II EPIDEMIOLOGICAL EVALUATION

In the northern region a malariometric survey of school children in October - December 1960 revealed four positives for P.falciparum out of 405 blood slides examined (1%).

In between the two cycles of spraying in the southern region, a malariometric survey was carried out in seventy-one villages. Out of 5663 slides examined 1633 were found positive (29%).

Susceptibility tests carried out in the Republic have shown that both A.gambiae and A.funestus are susceptible to DDT as well as to Dieldrin.

III PLAN OF ACTION FOR 1961

During the year, with assistance from WHO, the entire country will be surveyed and a Plan of Operations for a Pre-eradication Programme to start in 1962 will be prepared. Spraying operations will be implemented as in previous years to cover, in one round, 50,000 persons in the northern region and 250,000 in two cycles in the southern.

Also geographical reconnaissance of the malarious areas is planned to be completed during the year.

IV BUDGET AND COSTING

The Government has increased its Malaria budget from $116,000 in 1960 to $181,000 in 1961. UNICEF is also providing for 1961 operations, insecticides, transport, sprayers and anti-malaria drugs to a value of $39,500.

S U D A N

I SUMMARY OF ACTIVITIES IN 1960

The year 1960 was the fourth year of spraying operations in the northern section of Sennar Malaria Eradication Pilot Project where 211,000 persons were protected by one round of DLD Spraying (0.6 gr./sqm.).

In the southern section where operations started, first in 1958, DDT spraying (2 grs./sqm.) covered 261,000 inhabitants of 900 villages, in a single round.

In addition, DDT spraying was applied to the tents of 30,000 nomads frequenting the project area.

A special spraying scheme was also organized to cover the temporary huts of 46,500 cotton pickers who move in the area each winter.

Complementary spraying in the northern section which covered disturbed sprayed surfaces accounted for 20% of the total surfaces previously sprayed during the main spraying campaign.

Surveillance operations which covered 75,000 persons in 1959 expanded during the year to cover the entire northern section as well as 20,000 persons in the south; some eighteen surveillance agents, under the supervision of twelve overseers and three public health officers, took part in the operation and paid monthly visits to the villages.

II EPIDEMIOLOGICAL EVALUATION

Post-operational malariometric surveys carried out during November 1960 indicated the total interruption of transmission in the northern area. The 3,102 blood slides collected from infants in November 1960 proved to be negative. Also six P.falciparum cases discovered amongst 402 fever cases examined, proved to be imported cases.

Epidemiological evaluation was rather limited in the south, but indications show that a second round of spraying is required to cover the almost perennial transmission. The highest parasite rate encountered was in the villages along the Ethiopian borders (34%).

Susceptibility tests carried out in the Pilot Project area have shown that A.gambiae is still susceptible to DDT and Dieldrin, while A.pharoensis is resistant to Dieldrin but susceptible to DDT. No susceptibility tests have been carried out in the case of A.funestus as yet.

III PLAN OF ACTION FOR 1961

A Pre-eradication Survey has been initiated in 1961, in the country with assistance from WHO. The survey is expected to be completed by the end of the year and based on its findings a Plan of Operations for a Malaria Eradication Programme will be prepared.

Meanwhile, the present pilot project will continue its activities under guidance from the staff of the training center which will be established in Sennar early in 1962 with assistance from WHO and ICA for training of national personnel.

TUNISIA

I SUMMARY OF ACTIVITIES IN 1960

The report of the pre-eradication survey team was finalized during the year and a Plan of Operations for Malaria Eradication to cover the entire country over eleven years was prepared. Meanwhile, the Government continued its routine anti-malaria activities mainly through the use of anti-malaria drugs and minor larviciding operations.

No susceptibility tests have so far been carried out on the local vectors namely, A.maculipennis (labranchiae), A.sergenti or A.hispaniola.

II FUTURE PLANS AND PROSPECTS

The Government has, on several occasions, expressed its keenness to start the malaria eradication programme in the country. It is anticipated that by 1961, the Government will have a sufficient number of trained personnel and will be able to provide the necessary budget for the implementation of a stage-wise malaria eradication programme.

U.A.R. EGYPTIAN PROVINCE

I SUMMARY OF ACTIVITIES IN 1960

The comprehensive Plan of Operations for Malaria Eradication was finalized during the year. This plan contains the epidemiological findings of the WHO Pre-eradication Survey Team which began its activities in 1958 and completed from 1959, as well as those available from previous activities of the National MalariaControl Service. The plan received certain revisions in view of the latest findings in 1960. The programme extends over a period of eleven years covering in four stages the total population under risk, estimated at 18.355 million. According to the existing rate of population increase, this figure will be increased to 20.259 million as the programme advances. For this purpose, the country is divided into four operational zones, namely zone "A" with 5,425,000 population, zone "B" with 6,127,000, zone "C" 3,687,000 and zone "D" 5,020,000.

Each of the zones "A" and "B" will receive four years of spraying followed by four years of consolidation. Zones "C" and "D" will receive three years of spraying and four years of consolidation.Surveillance activities are planned to start as early as possible during the first year of the attack phase. This has been necessitated by the fact that the local vector: A.pharoensis,has got pronounced exophilic and exophagic tendencies apart from having a high tolerance to DDT. The species is already resistant to Dieldrin. No susceptibility test has been carried out on A.sergenti, the predominant species in the oases.

II ADMINISTRATIVE ASPECTS

The programme, as planned, is an autonomous organization under a National Malaria Eradication Board, which has full technical, administrative and financial authority in directing the programme. The executive functions are vested in the Director of the Malaria Eradication Service who acts as secretary to this Board. The programme, apart from its Headquarters, will have twenty Provincial Inspectorates. Each Provincial Inspectorate covers an average of 0.9 million population under risk. This is divided into a number of Malaria Stations, each of which is in charge of an average population of 0.2 million. The total number of these Malaria Stations is 90, distributed all over the malarious areas of the country. The functions of Headquarters and Inspectorate Offices are mainly overall planning, supervision and evaluation of activities, whilst the Malaria Stations are directly responsible for executing the operational activities within their areas in accordance with the Plan of Operations.

III PIAN OF ACTION FOR 1961

During the first six months of 1961 geographical reconnaissance followed by DDT spraying at 2 g./sq.m. in one cycle, will be carried out in the Malaria Stations of Giza, Ismailia, Embaba and Fayed in olving a population of 649,000. Beginning June 1961, geographical reconnaissance will be extended to the other twenty-one Stations in zone 'A' so that by the end of the year this activity will be completed in this zone.

Surveillance activities will start in the four Malaria Stations as soon as sprayingis completed and will continue until the end of the year.

IV BUDGET AND COSTING

The total programme expenditure during the planned eleven years is LE 19,322,200 (£48,305,500). The sum of LE 6,711,764 has already been approved by the Ministerial Planning and Economic Affairs Committee for the first five years ending in 1965. Government contribution to the programme for local cost is estimated at 72.7% of the whole programme's expenditure of which personnel cost is estimated at 53.2% over one half of the total programme's cost (see **ANNEX** I .

U.A.R. SYRIAN PROVINCE

I SUMMARY OF ACTIVITIES IN 1960

(1) Attack Phase

In the fifth year of the malaria eradication, DDT spraying covered a population of 1,092,700 or 70% of the total under risk (estimated at 1.57 million). DDT dosage was 2 g./sq.m. and the spraying took place in one cycle. However, a second round of DDT spraying was applied late in the summer in the Ghab valley, where a great number of seasonal migratory population moved in search of pastures and temporary employment in the agricultural schemes. The number of these was unusually high this year (25,000) in view of the severe droughts in the country. Administrative difficulties continued to hamper the timely start and progress of operations. Spraying started 25-45 days behind schedule, with inadequate seasonal supervisory staff. As a result, 75,000 persons(6.4%) were left unprotected when spraying was concluded. Some larval control operation protecting a population of 3,200 was also carried out on the borders of Jordan where the tributaries of Yarmuk River were treated with Paris-green dust at 100-200 mg/sq.m.

The emergency spraying in the Ghab valley was complemented by one month's drug distribution programme whereby weekly visits were made to the villages and the fever cases (12,710) were given a dose of Chloroquine. The weekly distribution of drugs was also practised in Kussair, where 11 cases of P.vivax appeared in an area with 6,000 inhabitants in consolidation phase. In Kussair, in addition to Chloroquine, 50 mg. of Daraprim were also given to fever cases (946).

(2) Consolidation Phase

Of the total population of 315,000 at risk in the Damascus Mohafazat, 253,700 in four districts completed their second year of consolidation. The remaining 61,300 persons, of the district of Kuneitra were still in the attack phase covered also by active surveillance. Due to shortage of surveillance agents (27 instead of 30) only 25-30% of the villagers in the large villages were visited monthly while in the small villages coverage was almost total.

In the Mohafazat of Homswhere 75,000 persons entered the consolidation phase in 1960, a similar problem was met. Of the ten surveillance agents needed, only four were assigned to work on surveillance operations. As a result, the surveillance coverage reached 51% or 38,528 persons only were visited, and many surveillance agents wasted a lot of time in treating other ailments other than malaria.

In the Mohafazats of Aleppo and Idlib in the north, a system of passive surveillance was developed covering 384,000 persons out of a total of 1,270,000 inhabitants. In this scheme the services of 120 voluntary collaborators were secured. It is interesting to note that of this number, more than 50% (66) are farmers, 25% village head-men (31) and the remaining 25% are barbers, guards or religious leaders. Also two hospitals, fifteen dispensaries and twelve Rural Health Centres contributed to the passive case detection activities. However, the contribution of health units was very limited as they provided only 15% of the total blood slides collected while voluntary collaborators collected 85%. Six surveillance supervisors checked regularly the activities of the voluntary collaborators and, wherever possible, collected also blood slides from fever cases.

II EPIDEMIOLOGICAL EVALUATION

Active surveillance in the consolidation phase collected 76,402 slides during the year of which only three were found positive - all vivax. Epidemiological investigations revealed that all three cases were imported, two from the attack areas and one from the Egyptian Province of the Republic.

The ratio of slides collected in the consolidation areas was 299 per 1000.

Susceptibility tests carried out showed A.sacharovi to be susceptible to DDT and DID. No similar tests have so far been carried out on A. superpictus or A.sergenti.

III PLAN OF ACTION FOR 1961

During 1961, attack phase coverage will be considerably reduced. DDT spraying will protect throughout the country 580,000 persons of whom 184,000 will receive two rounds of spraying. Also an emergency spraying estimated at 20% of total population under spraying will be carried out to cover temporary, new, or white-washed dwellings.

Consolidation phase will cover 990,000 persons in almost all the provinces, while surveillance activity is covering the entire population at risk.

Drug prophylaxis will be implemented in the Ghab valley as well as in the border area with Jordan where larviciding operations are carried out on the tributaries of the Yarmuk river.

IV BUDGET AND COSTING

The total cost of the 1961 operations is estimated at $485,200. Of this amount $321,700 or L.Syr.1,222,500 are the Government's commitments for the local costs. The reamining $163,500 have already been contributed by UNICEF for provision of insecticides, transport, sprayers and anti-malaria drugs.

The cost per capita for 1961 operations approximates $0.31.

V FUTURE PLANS AND PROSPECTS

It is anticipated that by the end of this year the four districts of Damascus Mohafazat will be ready to enter the maintenance phase, after three years of consolidation. It is also expected by 1963 to end consolidation phase in another 736,570 population who have entered consolidation phase this year.

Completion of the malaria eradication operations in the country is contemplated in 1964.