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Regional Office for the
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REPORT ON THE ADVISORY MEETING ON MALARIA ERADICATION IN EGYPT, IRAN, IRAQ, LEBANON, SAUDI ARABIA AND SYRIA

ATHENS, 27-29 JUNE 1956

AGENDA

1. Election of the Chairman, Vice-Chairman and Rapporteur.

2. Present status of malaria and progress towards malaria eradication.

3. Comments on the Report of the Inter-Regional Conference and particular problems in the various countries.

4. Reading and approval of the Report.

1. Election of the Chairman, Vice-Chairman and Rapporteur

At the opening session delegates from Egypt, Iran, Iraq, Lebanon, Saudi Arabia and Syria were present as well as the members of the Sixth Session of the Expert Committee on Malaria and WHO representatives.

Dr. W. Bonne, Director of the Division of Communicable Disease Services at WHO Headquarters, opened the meeting by welcoming the delegates and wishing them success in their discussions on the malaria eradication programmes in their countries. He referred to the resolutions taken by the previous Inter-Regional Malaria Conference, and expressed his thanks to the members of the Expert Committee on Malaria for attending the Advisory Meeting to advise on any technical problems that might arise.

The election of the Chairman, Vice-Chairman and Rapporteur proceeded and the following were elected:

Dr. Ali Hamami (Iraq) - Chairman
Dr. M.F. El Sobky (Egypt - Vice-Chairman
Dr. Ch. Mofidi (Iran) - Rapporteur

The WHO Secretariat was represented by Dr. M.A. Farid, Malaria Adviser for the Eastern Mediterranean Region.

In his address the Chairman expressed his thanks to the WHO Secretariat for convening the meeting which would give the delegates an opportunity of discussing their malaria problems, and he specifically expressed his appreciation of the presence of the members of the Expert Committee on Malaria who would offer their advisory services.

He then gave the floor to Professor G. Alivizatos who, on behalf of the Greek Government welcomed the delegates and offered his Government's services in arranging a visit to villages in the south where resistance to modern insecticides had been reported.

At its first working party the Advisory Meeting adopted as its Agenda the Preliminary Agenda submitted by the WHO Secretariat.

2. Present status of malaria and progress towards malaria eradication

In the arid zone extending from Morocco to the Indus River, malaria has alwasys been associated with agriculture, hence the Arabic name "Oasis fever". The successful demonstrations to eradicate malaria through the use of DDT residual spraying from certain oases in Egypt[1] and from groups of villages in Iran,[2] Iraq,[3] Jordan, Lebanon[4] and Syria[6] give promise that residual spraying campaigns organized on a total coverage basis will lead to malaria eradication for all these countries.

The conviction of the public health authorities of the countries of the Eastern Mediterranean Region regarding the feasibility of malaria eradication, prompted their delegations at the Eighth World Health Assembly to give full support to the resolution on malaria eradication. At the WHO Regional Sub-Committee meeting held in Beirut in 1955, the delegates took a unanimous decision and "called upon the governments of the

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See Annexes: 1, Egypt; 2, Iran, 3, Iraq;
4, Lebanon; 6, Syria

Member States within the Region, in which such eradication programmes are feasible, to draw up long term plans for eradication of malaria and to press their respective legislative bodies to commit adequate funds in advance for a five year programme".

With the introduction of the new policy of malaria eradication, Egypt, where malaria does not constitute a major health problem, has accepted the principle of converting its malaria control activities into a programme of eradication, by which malaria will be eradicated from the whole country in a period of five years.

Iran, where malaria control operations have been carried out on a large scale since 1950, has already taken the necessary steps for the re-organization of the Malaria Control Branch into a Division of Malaria Eradication Operations, working directly under the Director-General of Public Health. Epidemiological studies and training of various categories of personnel are carried out by the Institute of Malariology and plans of operations, prepared by the Institute, will be executed by the Division after approval of a Scientific Council. the plan of malaria eradication is already prepared, funds covering the cost of five years' operations have been earmarked by the Ministry of Health and Plan Organization, and assistance of WHO and UNICEF is requested.

Likewise, the conception of eradication has now been accepted by the Iraq government. A plan of operations involving WHO and UNICEF assistance and introducing important changes in the administrative pattern of the anti-malaria service, has been prepared. An autonomous budget of two million dinars has been approved and has been allocated by the Ministry of Development. This budget is to be administered by the Institute of Endemic Diseases, through the authority of a special Board and the status of the Institute is to be raised to match its increased obligations. Legislation to bring into force the above steps has been drawn up for approval by the Council of Ministers. A building, suitable to fulfil every scientific and training requirement connected with an eradication programme, is now under construction in Baghdad.

In Lebanon (where since 1954 the Anti-Malaria Section has been re-organized as the Anti-Malaria Branch under the Director of Technical Services of the Directorate-General of Health through the Divisions of Sanitary Engineering and Epidemiology), special steps have been taken for implementation of malaria eradication programmes. Necessary funds have been approved by the government, and a revision of the job classification and wages scales for personnel involved in malaria eradication is underway.

Saudi Arabia[5] has recently established a Malaria Section and is expanding its control activities as well as its training programme, in order to be able to deal with the many isolated malarious oases before a malaria eradication scheme covering the whole country can be contemplated.

The plan of malaria eradication has been accepted by the Government of Syria and also by the Special Committee of the Syrian Parliament, and the allocation of the first year budget has been approved. Special studies are planned to deal with certain problems arising from the practice of rice cultivation and from nomadism in Syria.

The Advisory Meeting of Malaria Eradication noted with special interest the great attention given and the favourable action taken by the above Member States of the Eastern Mediterranean Region towards the implementation of malaria eradication programmes in their respective countries.

The need for inter-country and inter-regional coordination and collaboration was emphasized, and the members of the meeting thanked WHO for the leadership taken in organizing the present meeting and expressed the wish that similar conferences and

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See Annex 5, Saudi Arabia

meetings be arranged where high officials of the governments could also be present and be orientated with regard to the present malaria eradication policy.

Furthermore, it was proposed that the activities and assistance of International Organizations which help Member States in malaria eradication and improvement of health standards, should be coordinated and balanced for the general benefit of all inhabitants of the Middle East.

3. Comments on the Report of the Inter-Regional Conference and Particular Problems in the Various Countries

3.1. Comments on the Report of the Inter-Regional Conference

The Advisory Meeting on Malaria Eradication in Egypt, Iran, Iraq, Lebanon, Saudi Arabia and Syria studied with great interest and unanimously endorsed the conclusions of the Inter-Regional Conference on Malaria in the Eastern Mediterranean and European Regions.

3.2. Particular Problems in Participating Countries

Certain problems related to malaria eradication programmes in some participating countries referred to in the report of the Inter-Regional Conference, were discussed at a meeting with the members of the Expert Committee on Malaria. These problems concerned rice cultivation, resistance of malaria vectors, nomadism and movement of population, drugs to be used during surveillance operations, control of pest mosquitoes, etc.

Special attention was drawn to the discovery of one larva of A. sergenti in the central part of Iraq near Karbala. This is the first record of A. sergenti in Iraq.

The meeting expressed the need for standardization of procedures for the determination of levels of resistance and also for the determination of the amount of insecticide deposits on wall surfaces and asked WHO to request the appropriate Expert Committees to discuss and lay down standard procedures for these tests.

It was proposed that regular meetings be held among officials of neighbouring countries to discuss problems pertaining to the epidemiology of malaria and the synchronization of anti-malaria campaigns on their borders at least three months prior to the beginning of the season of operations.

The help of WHO was requested for the granting of Fellowships to participating countries and also to secure a wide circulation of scientific documents and publications.

The participants at the Advisory Meeting on Malaria Eradication expressed concern over reported delays in the implementation of certain eradication programmes caused by the uncertainty of definite commitments on the part of international agencies. The participants urge WHO to use their good offices in removing such delays.

Special attention was given to the implementation of surveillance and it was emphasized that surveillance should start prior to the discontinuation of spraying operations and is considered as an integral part of malaria eradication operations.

4. Reading and Approval of the Report

The participants read the draft report on the meeting and passed the following resolution:-

The Advisory Meeting on Malaria Eradication

1. EXPRESSES its belief in the benefit of holding meetings at inter-country and inter-regional levels;

2. THANKS WHO for the leadership in coordinating the activities of neighbouring countries in the field of malaria eradication;

3. REQUESTS WHO to explore the possibilities of coordinating the assistance of International Agencies;

4. ENDORSES the conclusions of the Inter-Regional Conference on Malaria for the Eastern Mediterranean and European Regions, and

5. WISHES to emphasize that surveillance programmes should be considered as an integral part of malaria eradication operations.

ANNEX I

Egypt

The ravages of malaria in Egypt can be traced back through the history of the Middle Ages, and also during the construction of the Suez Canal.

Entomological surveys were started at the beginning of this century by Sir Ronald Ross, and were continued later by the Entomological Section of the Ministry of Agriculture (1924) and by Endemic Diseases Research Institute since 1932.

Active control work in Egypt began with the creation of a "Malaria Section" within the Ministry of Public Health in 1936 with six stations.

In 1942 Anopheles gambiae invaded Egypt from the South and caused explosive epidemics, with 171,951 cases and 23,285 deaths. This led to the establishment of a Gambiae Eradication Service, which succeeded in eradicating the vector by 1944. Since then a vigilant surveillance has been maintained in the southern part of Egypt and the northern part of Sudan. There is also an active exchange of information between the Egyptian and Sudanese Governments about the state of anopheline mosquitoes.

The work of the Malaria Section has been expanded since then and is now directing 42 main stations and about 62 sub-stations distributed all over the malarious sectors of the country, protecting eight millions of the Egyptian population with an expenditure of about 600,000 Egyptian pounds per year.

Prior to 1946, oil and Paris Green were used for larviciding. From that year and up to 1952, DDT has been used exclusively almost as a larvicide (except in Fayoum Province), but since 1952 residual spraying has been instituted more and more in various other localities, with a dosage of 2 g per square metre, one single spraying per year. Insecticides other than DDT, such as Gammexane and Octaklor, were also used. Air spraying with DDT over vast surfaces of water, such as rice fields and lakes, has been added to the programme.

In 1950, a blood survey started all over the Republic and a total of about 250,000 slides was examined from different cities and villages every year.

The following table shows some of the results obtained during the last six years:

Year	No. of slides examined	Positives for malaria	Percentage of positives	Benign Tertian		Malign.Tert.		Quartan	
				New	Relapses	New	Relapses	New	Relapses
1950	129,863	2694	2.07%	700	1590	178	199	27	-
1951	238,537	2174	0.90%	601	1109	127	195	142	-
1952	275,537	1315	0.47%	269	768	129	93	55	1
1953	288,220	466	0.12%	137	285	23	7	14	-
1954	265,404	679	0.25%	90	550	26	13	-	-
1955	183,629	317	0.17%	79	139	72	27	-	-
Total	1,391,190	7645	0.55%	1876	4441	555	534	238	1

ANNEX I(contd)

It is interesting to note that although the general percentage of positive slides appears to be getting higher in the years 1954 and 1955, yet the figures received from the villages where residual spraying was the method of control, on the contrary, show amelioration in their malaria state. This result is actually one of the main factors which has incited the generalization of residual spraying, over all infected localities.

With the introduction of the new policy of malaria eradication, Egypt has accepted the principle of converting its malaria control activities into eradication, by which malaria will be eradicated from the whole country in a period of five years.

A training centre on malaria and insect control is established in the Insect Eradication Section of the Ministry of Health, and is contributing to the training of malariologists, entomologists, technicians and malaria supervisors. This centre is also contributing to the training of candidates sent from neighbouring Arab countries.

Summary of Information Data

Total population.	22,200,000
Population living in potentially malarious areas.	14,675,000
Population protected in 1955:	
through residual spraying:	3,750,000
through larviciding:	4,900,000
Malaria budget 1955.	£1,722,000
Average annual cost of control programme (1955) per capita:	
residual spraying:	£0.12
larviciding:	0.18
Estimated annual cost of eradication per capita:	0.22

Main Malaria Vectors:

A. pharoensis, A. sergenti, (A. gambiae eradicated)

ANNEX 2

Iran

Malaria has been considered as the number one health problem in Iran. The existence of malaria is known from ancient times.

The population of Iran is approximately 21,000,000. In the rural areas are approximately 54,000 villages of which, according to the findings of the Institute of Malariology, 40,000 villages with a total population of about 12,000,000 are potentially malarious.

Studies have been initiated since 1900 by Iranian and foreign scientists who surveyed the problem during their travels in Iran.

Systematic entomological and epidemiological surveys started on a very small scale in 1940, by the Department of Parasitology, Teheran School of Medicine: these surveys showed the wide extension of the disease, and upon the request of the government, a short-term WHO advisory team was detailed in 1949 with the objective of determining the necessity for the assignment of a Malaria Advisory Team to Iran.

The WHO Advisory Team established in 1950 surveyed with the help of the anti-malaria service 112 villages (8,006 persons examined) in 1950, and 108 villages (5,719 persons examined) in 1951. They also surveyed separately five villages (with 341 persons examined) in 1952.

To meet the need for a training centre and extensive malariometric studies, the Institute of Malariology was established in 1952 with the cooperation of the Teheran University School of Medicine and the Ministry of Health, and with assistance from the WHO Advisory Team, and was attached to the Department of Parasitology, School of Medicine.

Malariometric surveys accomplished for the purpose of planning a National Malaria Control Programme in Iran are as follows:

Years	Villages surveyed	Persons examined
1950	112	8,006
1951	108	5,719
1952	177	14,297
1953	631	47,558
1954	1,996	110,829
1955	2,921	140,041

During four years of activities, the Institute has trained 136 malariologists, 26 entomologists, 50 laboratory technicians, 65 insect collectors and 385 surveillance agents, and with the help of Malaria Eradication Division, training and orientation courses established for about 300 persons of the Division involved in insecticides operations.

With the help of trained epidemiologists and entomologists and other scientific staff, the Institute has been able to complete the early studies concerning insect fauna of Iran, determination of important vectors, study of their susceptibility to insecticides, behaviour of DDT on Iranian walls, the distribution and epidemiology of malaria in Iran, etc.

These data have been used for the planning of malaria control operations and also for the preparation of a five years' programme of malaria eradication.

Malaria control activities have started since 1946, in limited sectors of the country, using drainage and oil-spraying of marshes and breeding places.

Since 1948, few villages in Teheran Province and the Caspian Region were sprayed with DDT on a demonstration basis, and active work started in 1950 by the Anti-Malaria Service of the Ministry of Health and Plan Organization with the guidance of the WHO Advisory Team. Mobile Units were sent from the centre to different parts of the country, headed by physicians who were also familiar with survey procedures, and conducted preliminary studies. They were replaced in 1952 by trained engineers and physicians who joined the Malaria Institute, and at the same time the organization of the Anti-Malaria Service was changed by creation of the Department of Public Health with the help of USICA (PHW). This Service was integrated as a branch of the Sanitary Engineering Division and the field operations gradually changed from mobile operations conducted by the Headquarters into decentralized operations, under technical supervision of the central organization, and administrative supervision of the Regional Directors of Public Health.

From 1951 to 1955, ICA has helped this programme by supplying insecticides and subsidizing the malaria control operation. Also UNICEF has assisted in 1954 by supply of 420 tons of DDT and 65 vehicles.

During these years DDT has been used on the basis of 2 grams per sq.metre single spraying each year (except for 1955, when about 40 tons of Dieldrin were used).

A summary of past insecticides operations follows.

Years	Villages sprayed	Persons protected
1950	7,862	2,428,000
1951	6,248	1,781,000
1952	12,459	3,556,000
1953	14,542	4,243,000
1954	15,405	3,915,000
1955	16,106	3,885,000

Since 1954, all main cities (about 52) have been excluded from the programme of spraying (hence the apparent reduction of number of persons protected) but about 1,000,000 inhabitants of these cities are indirectly protected by spraying of their suburban areas. In 1956, about 17,000 villages will be sprayed according to the programme.

PRESENT ORGANIZATION OF MALARIA ERADICATION PROGRAMME

1. Scientific Council of the Institute of Malariology. This body composed of technical authorities of the Ministry of Health, Institute of Malariology, Medical School, Plan Organization, Ministry of Agriculture, WHO and ICA Mission, is responsible for the approval of the plan of operations and also the scientific and technical procedure concerned with malaria eradication.

2. The Institute of Malariology. This Institute is responsible for conducting the needed malariometric and entomological surveys and researches and preparing the plan of eradication operations. Also training of personnel necessary for malariometric studies and field operations is carried out by the Institute.

The Institute of Malariology will also create and supervise in addition to two existing branch laboratories, 10 regional malaria laboratories for examination of blood smears collected during surveillance operations.

3. Malaria Eradication Operations Division. Since 1955, according to the advice of WHO experts, the Malaria Control Branch has been reorganized as the Malaria Eradication Operations Division as an integral part of the Department of Public Health of the Ministry of Health, with a central organization and ten regional (ostans) offices. This Division is in charge of the execution of malaria eradication operations.

It is in the plan that during 1956 division personnel will be further decentralized from an ostan basis to a shahrísten (county) basis. This will be done in order to ensure timely spraying of all areas and to ensure re-circulation of areas in order to spray those structures or localities previously left unsprayed.

The reduction of malaria endemicity after control operaations has been followed regularly by Institute survey teams, and at the present time in vast sectors in the Caspian Region, Central Azubaidjan, Teheran, and part of Kermanchah, Khuzistan, and Isfahan, there is no evidence of malaria transmission, and in 1954 in 300 villages and in 1955 in 1,200 villages of these zones the spraying operations have been discontinued and surveillance established. The malarious area of the country is divided into five zones, for the implementation of malaria eradication. A five years' programme has been prepared covering all malarious zones (40,000 villages of which 16,000 already under protection) for which the assistance of WHO and UNICEF has been requested.

The amount of 950,000,000 rials (about $13,000,000) covering the cost of five years operations has been earmarked by the Ministry of Health and Plan Organization and it is hoped that at the end of this period the transmission of malaria will be interrupted in all parts and that residual and persistant foci (if any) will be very limited in number and extent.

Summary of Information Data

Total population		21,000,000
Population living in potentially malarious areas		12,000,000
Villages situated in potentially malarious areas		40,000
Population protected during 1955		
- residual spraying		3,885,000
- indirectly protected		1,000,000
Malaria budget 1955	$1,700,000	
Average annual cost of control per capita	$ 0.35	
Estimated annual cost of eradication per capita	$ 0.43	

Main malaria vectors: A. sacharovi, A. maculipennis
A. superpictus, A. stephensi
A. culicifacies

ANNEX 3

Iraq

Iraq has an area of 444,474 square kms, half of which is desert or steppe too dry to support settled communities. The population is about 5,000,000 of which 3,800,000 live in potentially malarious areas. Malaria has been a serious health problem since ancient times in Iraq. Malariometric studies are conducted by the Institute of Endemic Diseases and the WHO Advisory Team.

Malaria control was started in 1941, around Baghdad area and was extended in 1947 on a nation-wide basis with the object of protecting certain economically important localities.

DDT was introduced into the campaign in 1948 but its use was restricted by shortage of funds, thus further expansion of the spraying operations was slow and irregular until 1952 when, under the simultaneous stimulus of WHO assistance and an improved economic situation, a more positive programme of control was initiated. Experience of residual spraying of hyperendemic foci in Northern Iraq had up to this time given disappointing results. Single villages sprayed under experimental conditions with DDT w.d.p., even at a dosage such a 3 g.m. sq/m. had not responded to an extent which could encourage the belief that this method alone would prove to be the solution to the problem of malaria control. The WHO Malaria Demonstration Team was able to provide conclusive evidence that good results could in fact be achieved by application of the same technique but on a total coverage basis and by spraying all the temporary structures. This enabled the government to embark with confidence on a mass control campaign, assisted by WHO and UNICEF, which was phased to cover all malarious communities in Iraq by 1958.

The implementation of this programme has by the summer of 1956 resulted in the following scale of operations.

Area covered:	97,500 sq. kms.
population directly protected:	2,200,000
population indirectly protected:	1,000,000

For these operations the following quantities of insecticides were used:

DDT 75% w.d.p.	350 tons
DDT technical	80 tons
Dieldrin	1.5 tons

By this stage, the organization of the malaria control was directed by the Endemic Diseases Institute, Baghdad, which was responsible for the planning, provisioning and technical supervision of the work. Owing to staff shortage, certain aspects of the administration of the malaria control in the field could not be assumed by the Endemic Diseases Institute and were delegated to the Chief Administrative Medical Officers in the provinces.

This sytem of splitting the administrative responsibilities from the technical ones was found to respond more or less to the requirements of the malaria control programme, but it has been immediately realized that it wes not wise to maintain it in connexion with the huge programme involved with the eradication campaign.

The conception of eradication has been now accepted by the Iraq government. A Plan of Operations has been prepared which introduces important changes in the administrative pattern of the anti-malaria service. Briefly, an autonomous budget of two million dinars has been approved and has been allocated by the Ministry of Development. This budget has to be administered by the Institute of Endemic Diseases, through the authority of a special Board and the status of this Institute is to be raised to match its increased obligations. Legislation to bring into force the above steps has been drawn up and is due to be approved by the Counci of Ministers.

A building, suitable to fulfil every scientific and teaching requirement connected with an eradication programme, is now under construction in Baghdad.

Summary of Information Data

Total population.	5,000,000
Population living in potentially malarious areas	3,800,000
Population directly protected (1955)	1,393,000
Population indirectly protected (1955).	1,090,000
Malaria budget 1955.	
Average annual cost of control programme (1955) per capita (in the north):	$0.23
Estimated cost of eradication per capita:	$0.44

Main malaria vectors: A. stephensi, A. superpictus, A. sacharovi, A. maculipennis

(A. sergenti recently recorded from one isolated oasis west of Karbala)

ANNEX 4

Lebanon

It seems certain that in Lebanon, with a total area of 10,070 sq. kms., malaria is not a recently introduced disease. Prior to 1946, it was rampant in districts representing over half the total area of the country and affected about one fifth (i.e. 300,000 persons) of the total population.

Malariometric documentation for the whole of the country before the assignment of WHO experts in 1951-1953 consisted of fragmentary data deriving from the Health Ministry's archives, medical services of the Allied armies during the Second World War and from a small number of national and international investigators who helped to establish a list of the most affected villages in the various parts of Lebanon.

Prior to 1946, the malaria control campaign was carried out in isoleted sectors with the available means, but since 1947 DDT and Gammexane were used for malaria control in the majority of the endemic districts.

During the period between August 1951 and December 1953 the demonstration work organized by the WHO team consolidated the results obtained in the country as a whole and helped to form a nucleus of adequately trained technicians and workers.

Since 1954, the Anti-Malaria Section has been reorganized toAnti-Malaria Branch under the Director of Technical Services of the Directorate-General of Health through the Divisions of Sanitary Engineering and Epidemiology.

In 1956, 25,776 houses over a territory of 3,110 sq. kms. were sprayed and 133,107 persons protected. In addition 13,612 persons were protected with other control methods. In 1955, 27,404 houses over 3,536 sq. kms. were sprayed and 142,547 persons protected with residual spraying and 120,814 persons with other methods.

With the existing competent personnel, experience alike in research and practical work, and thanks to the necessary material and equipment provided by WHO and UNICEF, and considering the results of the entomological and epidemiological surveys carried out throughout Lebanon during the years 1954 and 1955, the Lebanese Government has been able to continue malaria control and encourage the adoption of a malaria eradication programme.

Necessary funds have been approved by the Government and a revision of the job classification and wage scales for personnel involved in malaria eradication are under study.

Summary of Information Data

Total population:	1,500,000
Population living in potentially malarious areas:	300,000
No. of villages situated in potentially malarious areas.	750
Population protected in 1955:	
- residual spraying.	135,000
- larviciding:	119,000
Average annual cost of control programmes 1953 per captia:	$0.21
Estimated annual cost of eradication per capita:	$0.34
Main malaria vectors.	A. sacharovi, A. superpictus (claviger ? sergenti ?)

Resistance is reported in A. sacharovi, but this species has fortunately disappeared from the area where this phenomenon was observed.

ANNEX 5

Saudi Arabia

The epidemic of malaria of 1950 which occurred in the Jeddah area initiated increasing interest in the field of malaria control in the Kingdom of Saudi Arabia where many varieties of topographic and climatological conditions exist.

Successful reduction in malaria eradication has been obtained in areas where, since 1952 under the guidance of WHO Advisory Teams, residual spraying of DDT is carried out.

The control has been found difficult among nomadic tribes and special consideration is also given to the pilgrims and labourers coming from neighbouring countries.

But in certain other areas, DDT spraying has proved effective; for example Wadi Fatma which is a valley between Jeddah and Mecca has received four annual DDT sprays since 1952.

This has reduced spleen indices from almost 80 to 100% by well below 10% and parasite rates from 31 to 2%.

There also has been no sign of DDT resistance in that area where the main vector is Anopheles gambiae.

At Nagran Valley 1,000 ~~kms.~~ south of Jeddah, on the eastern slopes of the Higaz escarpments, successful control was achieved after the first DDT spray. Spleen indices were reduced from almost 70% to 8% and the parasitic rate was reduced from 50% to 3%; and infant parasite rate from 40% to zero.

The Government, assisted by WHO team, has established a well-equipped training centre in Jeddah at which training courses are given to various categories. At the same time both WHO and national teams are carrying out surveys and control operations in some parts of the Kingdom.

The present control operations are carried out at Jeddah, Mecca area and the important valleys around a radius of 200 kilometres.

Moreover the government has established a new malaria station at the eastern province where Anopheles stephensi was said to be resistant to DDT after six years of irregular spraying. The national staff there is now taking charge of surveys and control operations by Dieldrin to which Anopheles stephensi was found to be susceptible.

The government is also inaugurating the establishment of over nine malaria stations in most of the highly endemic areas.

The government of Saudi Arabia has accepted the principle of eradication and is planning to extend the control programme, as well as training facilities offered to provide the necessary personnel. This can be considered as a preliminary step before a malaria eradication programme could be implemented. Undoubtedly the present control programme will contribute much in safeguarding against any malaria risk to which pilgrims might be exposed during their travel and sojourn in the sacred cities.

ANNEX 5 (contd)

Summary of Information Data

Total population.	7,000,000
Population living in potentially malaricus areas:	5,000,000
No. protected during 1955 campaign:	
- through residual spraying.	530,000
- through larvicicing.	150,000
Average annual cost of control programme (1955) per capita	
- residual:	$0.28-0.35
- larvicicing:	$0.18
Target to be protected in 1956:	
- residual.	559,000
- through larvicicing:	150,000

Main malaria vectors. A. sergenti, A. gambiae, A. stephensi

ANNEX 6

Syria

Malaria is a major health problem in Syria, that threatens the lives of 1,150,000 inhabitants out of the total population of almost 3,800,000.

Malaria control operations started in 1949 by the Endemic Diseases Department, and through national efforts protected about a quarter of a million people, mainly in the south, by residual spraying operations, combined with the other anti-malaria measures.

In 1952 the Syrian Government requested the technical assistance of a WHO team in order to extend the anti-malaria programme and establish a training centre.

Starting from 1952 to 1953, UNICEF contributed to this programme by supplying the necessary insecticides, vehicles, and other equipment. These residual spraying operations in the hyperendemic malarious areas in Syria mostly in the south, middle and the coastal area led to dramatic results, especially in the Damascus area as well as in the Horan Plateau in the province of Homs.

In the Damasucs area, after three years of residual spraying, malaria transmission was interrupted, and since three years no new case has been reported.

These efforts and good results impressed the government of the possibilities of malaria eradication in the country, implying a total coverage of all malarious areas, and led to the adoption of the WHO policy regarding malaria eradication and hence to the implementation of the programme.

The new plan of malaria eradication has been accepted by the government and the special committee of the Parliament, and the allocation of the first year budget amounting to 736,000 Syrian Pounds has been approved. The first intention to cover all the malarious areas inhabited by 1,150,000 people during 1956, has been delayed because of the inevitable legislative and administrative procedures and in 1956 operations will cover about 600,000 people living in areas protected previously by residual spraying and the rest in adjacent malarious districts.

Although rice field cultivation and nomadism might produce certain difficulties during the implementation of the programme, yet they are considered surmountable and it is hoped that suitable measures will be taken to deal with these problems and that the implementation of the malaria eradication programme will be carried through to its final goal.

Summary of Information Data

Total population:	3,600,000
Population living in malarious areas:	1,150,000
No. protected during 1955 (residual spraying):	283,000
Average annual cost of control programme 1955 per capita:	$0.38
Estimated average annual cost of eradication per capita:	$0.31
Main vectors:	A. sacharovi, A. superpictus A. sergenti, (claviger ?)

Experts invited by WHO or sent by their governments

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Dr. M.T. FAKIR
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Dr. Ali HAMAMI (Chairman)
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Dr. Ch. MOFIDI (Rapporteur)
Acting Director, Malaria Institute
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