 Provisional agenda item 2.2.3

DETAILED REVIEW OF THE OPERATING PROGRAMME
Report on the Malaria Eradication Programme

1. Status of the programme

In amplification of Official Records No. 199, Appendix 10, page 93, and in reference to the wish expressed at the Twenty-fourth World Health Assembly and at the Executive Board, forty-ninth session, the following information is provided on the development of malaria eradication programmes.

At 31 December 1971, of the estimated 1827 million people living in the originally malarious areas of the world about whom information was available, 1346 million (74 per cent.) were in areas where malaria had been eradicated or where eradication programmes were in progress. Of these 728 million (40 per cent.) of the population of the originally malarious areas were living in areas in the maintenance phase, 299 million (16 per cent.) in areas in the consolidation phase, 315 million (17 per cent.) in areas in the attack phase and four million (less than one per cent.) in areas in the preparatory phase. Of the 480 million people (26 per cent.) living in areas where eradication programmes were not yet in operation, 210 million were benefiting from limited malaria control measures.

The Organization assisted 42 malaria eradication projects and 27 projects for other types of antimalarial action during 1971. In Cuba, Mauritius and Yugoslavia, visits were made to assess the progress of malaria eradication programmes and to determine whether the countries had reached a stage when they could be considered for inclusion in the WHO official register of areas where malaria has been eradicated. Reviews in connexion with the revised strategy of malaria eradication were undertaken by a WHO team in Iraq and in East Malaysia (Sarawak). In the former country the Government accepted the conclusion that malaria eradication was feasible and desirable and should be carried out within defined time limits. In the latter country, the Government has adopted a malaria control programme on the lines recommended by the review team.

In the WHO African Region a programme has been prepared for malaria control adapted to the resources and needs of the countries of the Region. Direct assistance in the form of advisory services either on a long- or short-term basis was given to some 15 countries in respect to planning of urban malaria control surveys of the malaria situation on a country basis and in development projects, implementation of antimalaria drug distribution schemes in rural areas, training, and trials of residual insecticide spraying. As regards urban malaria, control work was undertaken with WHO assistance in Yaoundé, Bangui, Fort-Lamy, Conakry, Monrovia, Blantyre in Malawi, Lagos and eight other towns and a tourist centre in Nigeria, Freetown and Lusaka and copper producing centres in Zambia. In the last mentioned country, advice on malaria control was also given in respect of tourist centres and irrigation and resettlement projects. In Burundi, Comoro Archipelago, Guinea and Tanzania, malaria surveys were carried out; in the first named country in respect of Mossos-Kom Kuesso Valley Development Scheme. A comparison of the frequency of malaria in schoolchildren receiving prophylactic chloroquine and in those not receiving that drug was undertaken in Cameroon. In Senegal, where chloroquine is available to the population throughout the country, a scheme has been launched for the provision of chemoprophylaxis to 500 000 children in the 0- to five-year age-group in which the overall mortality rate is 355 per thousand. In Togo, where a pilot project of residual insecticide spraying is being carried out, studies are also being
undertaken on school absenteeism and morbidity in schoolchildren and on the registration of
deaths due to malaria. Mauritius, following a malaria eradication programme, has remained
free of indigenous malaria for more than three years. In La Réunion, which is in the con-
solidation phase, five autochthonous cases occurred.

In the WHO Region of the Americas, further progress was recorded. In attack phase areas
in Argentina, transmission appears to have been interrupted. In Brazil, areas in the attack
and consolidation phases can enter the subsequent phase of the programme. In Costa Rica,
the prevalence of malaria has reached the lowest level yet recorded in the country. In
Ecuador the programme continues to receive high priority from the Government because of the
beneficial result to the economy. In Mexico increased funds have been made available by the
Government to pursue action in the Gulf region and the Yucatan. In Panama, only 0.34 per
cent. of the 300 000 blood films taken were positive for malaria parasites compared with
6.3 per cent. two years previously. In Paraguay, the number of malaria cases occurring
dropped from 50 000 in 1967 to 400 in 1971 following the reintroduction of full-scale attack
measures in 1969. The situation remained favourable in the programmes in British Honduras,
Dominican Republic and Guyana.

There were further reports of resistance of Plasmodium falciparum to chloroquine; this
has now been confirmed in Panama. In Haiti, the same parasite was reported to be resistant
to pyrimethamine and cycloguanil but still susceptible to chloroquine. Assisted by donations
from the Federal Republic of Germany, a number of countries in Central America introduced
wide-scale residual spraying with the carbamate insecticide propoxur in areas where the
vector anophelines are resistant to chlorinated hydrocarbons. Recent reports indicated that
this new insecticide was reducing transmission in Nicaragua and Guatemala, but the results
from Honduras and El Salvador were less conclusive. In Brazil, Costa Rica, Dominican
Republic, Guyana and Peru where malaria eradication programmes are in an advanced stage in
part, or in some cases all, of the country, integration of malaria eradication activities into
the general health services is being attempted, in some cases through pilot projects
initially.

In the South-East Asia Region of WHO, additional assistance was given to the programme in
Burma, with the immediate objective of malaria control; training of laboratory staff was
undertaken. The situation in Ceylon, where a severe outbreak of malaria reached its peak in
early 1970, has improved, especially in the epidemic areas of vivax malaria infection, but
some increase in the number of cases of falciparum malaria has been noted. An independent
assessment of the situation was made in March/April 1972. Following recommendations made in
the annual assessment of the malaria eradication programme in India, areas with a population of
1.7 million were advanced from the attack to the consolidation phase. The total population
of areas in the maintenance phase now amounts to about 320 million. In a number of
areas of the country, however, the situation is deteriorating, and compared with the half
million cases reported in 1970, over 600 000 had already been reported in the first nine
months of 1971. Much of this deterioration was due to the delay in procuring the appro-
priate insecticides. To assist in overcoming the situation, the Central Government has
taken responsibility for the entire operational costs of the staff appointed by the State
Governments and also the responsibility for the control of malaria in many urban areas.
The Government of Indonesia has increased its budget for the antimalaria operations mainly in
Java. WHO advisory assistance has also been increased. It is hoped to extend malaria
control to the other islands of the country. In Maldives, the antimalaria programme is being
extended to cover all the atolls. Following the annual assessment of the Nepal programme,
it was recommended that areas with a population of 300 000 in the attack phase be advanced to
the consolidation phase. In Thailand during 1971 a revised plan of operations has been
evolved for the period 1971-1977 with the goal of malaria eradication but to be implemented
on a long-term basis to suit local conditions and available resources.
In the WHO European Region, additional areas in Greece passed from the consolidation phase into the maintenance phase. In Algeria, the attack phase of the programme was expanded to cover a total population of two and a quarter million. Preparatory activities were being undertaken in areas with a population of 1.5 million and the remaining four million under risk were partially protected by focal insecticide spraying, antilarval measures and chemo-prophylaxis. In Morocco, where some increase in the number of malaria infections were reported, a co-operative programme has been proposed to ascertain whether it is feasible to undertake a combined attack against the aquatic stages of the anopheline mosquito and the snail intermediate hosts of schistosomiasis. In Turkey, although the malaria situation is under control for the most part, outbreaks of the disease occurred in consolidation phase areas in the neighbourhoods of Ankara, Adana and Içel. The extent of the areas in the neighbourhood of Adana where Anopheles sacharovi is resistant to DDT and dieldrin were increasing and DDT resistance in A. hyrcanus was reported in the same area. Malathion was used for focal spraying in these three areas as well as in Edirne.

In the Eastern Mediterranean Region of WHO, the programme in Afghanistan has been revised. In the north, where bilateral assistance has been received from the Union of Soviet Socialist Republics, the larvivorous fish Gambusia has been introduced in an area where transmission has continued, and Abate larvicide is being used in rice fields. The programme in Ethiopia has also been revised in light of the recommendations of the strategy review team. Improvements in the attack phase areas in Iran have relieved the pressure on consolidation phase areas. In Iraq, the increased use of malathion proved most successful in areas where A. stephensi is resistant. The number of cases due to malaria was reduced from an estimated 750 000 in 1946 to 6500 in 1971. The Ministry of Health estimates that the annual economic gain from anti-malaria operations is about US$ 7.5 million per year. This programme received additional support from the Government during the year. The programme in Jordan has shown steady progress during the year. In Pakistan, antimalaria measures were delayed because of shortage of funds and a noticeable increase in cases has resulted in most zones. Assistance to antimalaria activities continued in the People’s Democratic Republic of Yemen, Saudi Arabia, Somalia and Sudan. A review of the last-mentioned programme was undertaken during the year and it was recommended that the Government should extend its control activities and undertake the eradication of A. gambiae from the banks of the Nile and of the lake developing in the north of the country as a result of the Aswan dam. Although the epidemiological situation in the Syrian Arab Republic has much improved, the resistance of A. sacharovi to dieldrin is spreading and that insecticide may no longer be able to prevent transmission from recurring. Most of the northern part of Tunisia is in the consolidation phase and the general situation is good despite the occurrence of a few focal outbreaks in the southern governorates. A new project of malaria control has been implemented in the Sultanate of Oman and a preliminary survey made of the existing malaria situation and the facilities available for its control.

The year 1971 was essentially one of consolidation as far as the malaria eradication effort in the Western Pacific Region of WHO was concerned. In the immediate past years, regressions have been observed in some countries which led to reversions from the consolidation to the attack phase of the programmes concerned. However, no epidemics or grave setbacks occurred in 1971. The malaria eradication programme in the British Solomon Islands Protectorate proceeded according to plan. In Brunei, where the programme is in the maintenance phase, there was only one suspected autochthonous case. The eradication programme in West Malaysia had good government support but encountered certain difficulties in national staffing; cases continued to be reported in areas in the late attack phase. In Sabah, East Malaysia, the Government gives high priority to the programme in the conviction that no socio-economic progress could be achieved without a sustained attack on malaria. In Sarawak, the programme has been redefined as one of control. In the Philippines, an assessment of the malaria situation was made and further integration of the malaria service into the general health service was proposed. A technical difficulty is the diminishing sensitivity of some strains of Plasmodium falciparum to 4-aminoquinolines. The planning of the antimalaria programme in the Territory of Papua and New Guinea was adjusted in line with the recommendation
of a WHO malaria assessment team. In the New Hebrides, a malaria control programme is being instituted. Antimalaria projects were maintained in Viet-Nam, the Khmer Republic and Laos. In the latter country, malaria control activities, mainly using residual insecticides, have been carried out in the Vientiane plain and Nam Ngun Dam area with good results.

Comparing the status of malaria eradication at the end of 1971 with that of 1970, one has to come to the conclusion that the progress of the programme has been rather slow regarding the population of areas passing from attack to consolidation, or consolidation to maintenance phase. However, it has to be realized that, following the revised strategy of malaria eradication adopted by the Twenty-second World Health Assembly, a number of governments were faced with difficult decisions regarding their malaria eradication programmes, i.e., whether (1) to pursue eradication to a successful termination, (2) to limit intensified eradication to areas with a high malariogenic potential, while holding the gains achieved in other areas through an adequate malaria surveillance mechanism, until such time as governments can muster the required means to effect full eradication, or (3) to convert the whole programme or a large part of it, to long-term malaria control that can eventually be transformed into a fully-fledged, time-limited eradication programme. Making a choice between these courses of action was difficult, particularly when it had to be borne in mind that any relaxation in antimalaria activities due to the conversion of resources might lead to full re-establishment of malaria endemicity and that even before this happened, increased morbidity and mortality would occur. Three factors had to be taken into account when deciding on the continuation of programmes, namely:

(a) the financial resources available and required, including international and/or bilateral assistance;

(b) the state of development of the basic health services and the rate of progress in the implementation of national health plans; and

(c) the efficiency of new insecticides, or of supplementary measures of other types recommended for the interruption of malaria transmission in problem areas.

The objective of a malaria eradication programme is first by various measures to protect the population exposed to the risk of malaria and, subsequently, to free the population from the disease. The table hereunder indicates the progress made in this respect, in terms of the population involved.

**TABLE 1**

<table>
<thead>
<tr>
<th>Phase of programme</th>
<th>Population in millions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malaria eradication programmes:</td>
<td></td>
</tr>
<tr>
<td>Maintenance</td>
<td>220</td>
</tr>
<tr>
<td>Consolidation</td>
<td>-</td>
</tr>
<tr>
<td>Attack</td>
<td>569</td>
</tr>
<tr>
<td>Preparatory</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>789</td>
</tr>
<tr>
<td>Where no malaria eradication in operation</td>
<td></td>
</tr>
<tr>
<td>but where limited control measures instituted</td>
<td>-</td>
</tr>
<tr>
<td>Without specific antimalaria measures</td>
<td>421</td>
</tr>
<tr>
<td>Total</td>
<td>421</td>
</tr>
<tr>
<td>Grand total</td>
<td>1 210</td>
</tr>
</tbody>
</table>
As can be seen from the above table, within the first 10 years of the programme, the population in the maintenance phase almost tripled; with 619 million in 1966 compared with 220 million in 1957. Of course, these figures also include the population increase. At the same time, the amount of people not benefiting from specific antimalaria measures was reduced by nearly 50 per cent. Other figures indicate progress in areas where the population was protected by malaria eradication measures as the programme passed through the different phases from the preparatory to the attack and the consolidation phases.

In addition to the overall progress of malaria eradication programmes, there has been a very significant reduction in the malaria mortality rate in countries where eradication has not been achieved within the time-limit originally planned. For example, in countries of Central America the general mortality rate in the period 1955–1968 indicates a reduction of 30–40 per cent. However, the reduction in the malaria death-rate for the same period ranges between 71 per cent, and 100 per cent. A reduction of the same order in the malaria death-rate was achieved in countries in Asia. In the Philippines, for example, the general mortality rate was reduced from nine per cent. in 1955 to 7.9 per cent. in 1968. At the same time the malaria death-rate dropped from 15.6 per cent. to 2.9 per cent. The same indices in Thailand demonstrate a reduction in the general mortality rate from 8.3 per cent. to 7.3 per cent. while the malaria death-rate dropped from 63.2 per cent. to 10.4 per cent. While the life-saving effect of malaria eradication programmes complies with one of the ethical principles of the health service, the much reduced malaria morbidity results in an increase in the economic potential of the areas previously affected by the disease.

2. International assistance to malaria eradication programmes

Since the initiation of the global malaria eradication programme the Director-General, in submitting the report on the status of the programme to the World Health Assembly, has acknowledged the generous aid provided to countries by international and bilateral agencies and has indicated the need for the continuation of such assistance. As the programme progressed, countries experienced an increase in expenses of the malaria eradication programme, particularly in respect of local costs and supplies, which resulted from the general overall rise in the cost of living.

The assistance provided since 1956 by UNICEF to a number of malaria eradication programmes in terms of insecticides, laboratory and other equipment, antimalarial drugs and transport, amounting in some years to more than $5 million, has been of considerable help to governments in the carrying out of their country-wide programmes. While appreciating that UNICEF cannot be expected to provide assistance to malaria eradication programmes indefinitely and has to take into account many other claims on its resources in its drive towards a better life for children, it is noted with concern that at its 1970 session the Executive Board of UNICEF decided to phase out assistance to malaria eradication programmes towards the end of 1973. While UNICEF's help to the development of basic health services will no doubt be of great value to the long-term impact of antimalarial activities, it must not be forgotten that specific measures are indispensable to control both the vector and the parasite.

Bilateral assistance, although not universally distributed, enabled a number of countries to carry out malaria eradication programmes. Of particular importance in this regard was the assistance provided by the United States Agency for International Development (USAID). It is understood that the recent USAID multilateralization policy will not affect financial assistance to countries in terms of commodities. Other countries have provided assistance more recently, notably the Federal Republic of Germany to Central American countries and the Union of Soviet Socialist Republics to Afghanistan. This is a most welcome development. At this very crucial stage of the global malaria eradication effort, more resources still are needed to maintain the goals achieved and promote further progress.
As far as WHO is concerned, maximum assistance will continue to be provided within budgetary possibilities. The tremendous effort made in the period 1956-1966 to assist countries in the training of national personnel, together with the success achieved in malaria eradication programmes, has made it possible to reduce the number of WHO technical advisory staff assigned to different countries, as indicated in Table 2.

The reduction in WHO personnel has mostly affected the sanitarian category, although sanitary engineers and other categories are also involved. As may be expected, the number of WHO malarialogist posts has been maintained at a relatively high level, taking into account that the Organization is assisting 69 countries in their efforts to control and eradicate malaria. WHO personnel will have to be maintained at a similar level for quite some time in those countries carrying out malaria eradication programmes. No doubt additional staff will be required for malarious countries who will be undertaking organized malaria control activities.

For quite understandable reasons certain countries are in great need of assistance in the form of commodities, due to inadequate availability of foreign exchange. Within its limited resources the Organization has assisted several countries, particularly in Asia, with insecticides, antimalarial drugs and laboratory equipment.

Table 3 shows the development of international assistance to malaria eradication programmes for the years 1956, 1961, 1966 and 1971, by WHO regions and sources of funds. As the figures indicate, the expenditure was highest in the period 1961-1966 (in fact, between 1960 and 1967) and this corresponds to the degree of development of the malaria eradication programme since its initiation. These figures also indicate that the resources under the regular budget of WHO had to be increased as from 1966 and maintained at a relatively high level, partly to make up for the amounts previously provided from voluntary funds (Malaria Eradication Special Account) and other sources. The data presented in Tables 2 and 3 are summarized in Graph 1, which indicates the trends regarding technical advisory services, expenditure from WHO regular budget and all funds of international assistance to malaria eradication programmes. The trend in expenditure compares well with the data presented in Table 1 on the progress of malaria eradication with particular reference to population figures under the consolidation and maintenance phases.

3. Future prospects

The dynamic complexity of malaria transmission conditioned by unaccountable ecological situations may slow down the progress of malaria eradication programmes in certain areas and this has been the cause of some concern to health administrators.

There is no doubt that such ecological conditions require much greater effort in view of the intensity of malaria transmission. The behaviour of humans, including the ever-growing population movement, coupled with attempts to reclaim new land from forest and desert areas for the purposes of agricultural cultivation, contributes to the intricacy of the task. Nevertheless, the feasibility of malaria eradication has been proved in the past 15 years. Indeed, at the end of 1971, a total of 37 countries are rightly claiming achieved eradication. The question of feasibility was thoroughly examined by the Fifteenth Expert Committee on Malaria in 1970\(^1\) and the validity of the concepts underlying the malaria eradication policy was confirmed.

What then needs to be done in order to accelerate the progress of malaria eradication programmes at present in operation? Before a response can be given to this question it should be pointed out that there is no single remedy and that this problem has to be looked upon from technical, administrative and financial angles.

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### TABLE 2

**WHO ADVISORY PERSONNEL ASSIGNED TO MALARIA ERADICATION PROGRAMMES**

**BY REGIONS FOR YEARS 1956, 1961, 1966 and 1971**

<table>
<thead>
<tr>
<th>REGION</th>
<th>Malarologists</th>
<th>Entomologists</th>
<th>Sanitary Engineers</th>
<th>Sanitarians</th>
<th>Laboratory Technicians</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>African</td>
<td>5</td>
<td>26</td>
<td>28</td>
<td>9</td>
<td>4</td>
<td>17</td>
</tr>
<tr>
<td>American</td>
<td>9</td>
<td>42</td>
<td>31</td>
<td>35</td>
<td>-</td>
<td>23</td>
</tr>
<tr>
<td>South East Asian</td>
<td>6</td>
<td>32</td>
<td>23</td>
<td>20</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td>European</td>
<td>-</td>
<td>7</td>
<td>5</td>
<td>4</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Eastern Mediterranean</td>
<td>8</td>
<td>22</td>
<td>25</td>
<td>15</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td>Western Pacific</td>
<td>4</td>
<td>14</td>
<td>19</td>
<td>12</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>32</td>
<td>143</td>
<td>131</td>
<td>95</td>
<td>14</td>
<td>73</td>
</tr>
<tr>
<td>Division of Malaria Eradication WHO/HQ</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**GRAND TOTAL**

- 34

- 150

- 138

- 102

- 14

- 74

- 44

- 27

- 4

- 42

- 31

- 19

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* = Scientists.  ** = Administrative Officer, Administrative assistant, Technical officer.  *** = Secretaries.
<table>
<thead>
<tr>
<th></th>
<th>WHO Regular Budget</th>
<th>Voluntary Fund for Health Promotion</th>
<th>UNDP/TA</th>
<th>PAHO (ALL FUNDS)</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>AFR</td>
<td>38</td>
<td>179</td>
<td>1527</td>
<td>260</td>
<td>-</td>
</tr>
<tr>
<td>AMR</td>
<td>-</td>
<td>184</td>
<td>417</td>
<td>574</td>
<td>9</td>
</tr>
<tr>
<td>SEAR</td>
<td>60</td>
<td>81</td>
<td>1007</td>
<td>923</td>
<td>-</td>
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<tr>
<td>EUR</td>
<td>-</td>
<td>46</td>
<td>436</td>
<td>482</td>
<td>-</td>
</tr>
<tr>
<td>EMR</td>
<td>46</td>
<td>93</td>
<td>1117</td>
<td>1570</td>
<td>-</td>
</tr>
<tr>
<td>WPR</td>
<td>22</td>
<td>46</td>
<td>640</td>
<td>637</td>
<td>-</td>
</tr>
<tr>
<td>Inter-Regional (IR)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Total Regions + IR</td>
<td>436</td>
<td>712</td>
<td>5567</td>
<td>5209</td>
<td>-</td>
</tr>
<tr>
<td>ME/HQ</td>
<td>41</td>
<td>229</td>
<td>363</td>
<td>433</td>
<td>-</td>
</tr>
<tr>
<td>Total Regions + IR + ME/HQ</td>
<td>477</td>
<td>941</td>
<td>5930</td>
<td>5702</td>
<td>-</td>
</tr>
<tr>
<td>TOTAL WHO + PAHO</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>154</td>
</tr>
<tr>
<td>UNICEF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4773</td>
</tr>
<tr>
<td>GRAND TOTAL WHO + PAHO + UNICEF</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6098</td>
</tr>
</tbody>
</table>
GRAPH 1. MALARIA ERADICATION PROGRAMME

- - - - - = FILLED POSTS (100)

----- = WHO REGULAR BUDGET (IN MILLIONS OF US$)

- - - - - = TOTAL EXPENDITURE (ALL FUNDS IN MILLIONS OF US$)
As far as the technical aspect is concerned, it has to be accepted that the efficiency of insecticides such as DDT has brought about a somewhat relaxed attitude towards ecological studies of malaria transmission and for very good reasons. It is correct that, in a campaign aimed at eradicating malaria, spraying operations and surveillance activities must be given absolute priority in order that total coverage in space and time can be achieved. Of course, epidemiological evaluation and assessment had been carried out but again giving priority to operational aspects rather than the biological complexes. The intricate details of the host-parasite relationship and man-mosquito contact require ecological studies that are in themselves time-consuming operations. In the past few years increased attention has been paid to this aspect, particularly in areas where DDT is no longer effective, such as in Iran, Iraq, the Syrian Arab Republic, Turkey, Thailand and Philippines, as well as in countries of Central America. In order to provide facilities for the absorbing of the results of newer technological development, WHO convened seminars and refresher courses in the epidemiology of malaria, organization of antilarval operations and in entomology related to malaria. At the same time, basic research in the field of malaria is being stimulated, which includes WHO assistance to developing countries in establishing facilities for research and epidemiological purposes.

Information regarding details on research undertaken in relation to malaria is included in the report of the Director-General to the forty-ninth session of the Executive Board (EB49/WP/4). However, some of the subjects of research should be highlighted in view of the impact that the results of such research may have on future malaria eradication programmes. Studies on immune phenomena involved in malaria infection, including immunization, deserve to be mentioned first. The protection afforded by the inoculation of irradiated sporozoites in a rodent plasmodia experimental model gives hope of a development of an efficient immunizing agent against malaria, particularly in view of recent similar results obtained in a simian malaria experimental model. Simultaneously with the development of an immunizing agent based on irradiated sporozoites, efficient antigens were prepared from erythrocystic forms of plasmodia, which may be required to supplement the protection anticipated from irradiated sporozoites. It is realized that much further complex basic research is required before the immunization against malaria becomes practicable. Another subject is the development of new insecticides, required primarily for areas where DDT is not as efficient as it used to be at the beginning of the programme. Two insecticides are under intensive study in this connexion and it is hoped that they will be available for application in a relatively short time.

The administration of malaria eradication programmes in some countries in the past has suffered from delays in recruitment, in the ordering of commodities and other weaknesses. The malaria strategy review teams brought most of these shortcomings to the attention of governments. In addition, studies of the socio-economic impact of malaria and malaria eradication have been made in some countries with WHO assistance, aimed at evaluating at the same time the benefit of achieved malaria eradication. It appears, however, that, while it is relatively easy to evaluate the economic and human losses caused by malaria, the evaluation of the benefit derived from achieved eradication is quite a different and more difficult matter. An appropriate methodology, covering both economic and social (ethical) aspects has yet to be developed.

Other aspects of malaria eradication programme administration, such as modern management, are receiving attention within the framework of the organizational structure of each country, with an attempt at an integrated approach wherever feasible.

There is no doubt that the most serious problem some governments are facing in carrying out malaria eradication programmes is the adequate and timely financing of such programmes and there are very understandable reasons for this. Most governments are committed to the development of basic health services but there is an increasing demand for the organized

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1 See also Official Records No. 199, Appendix 10, pp. 95/97.
control of communicable diseases and improvement of hospital and laboratory services in general. Under the circumstances the taking of a decision on establishing priorities is extremely difficult. Thus, it may appear as a *circulus vitiosus* without basic health services the health of rural communities cannot be improved significantly but, on the other hand, while the prevalence of communicable diseases is very high a large proportion of the health budget has to be diverted for the treatment of those suffering from these diseases and, therefore, less funds are available for the further development of basic health services.

It is hoped, however, that, with further efforts and international and bilateral assistance, governments - having consolidated future plans - will be in a position to overcome the difficulties which their malaria eradication programmes are facing.

For understandable reasons, priority has been given in this report to the status of progress of malaria eradication programmes. However, a number of malarious countries have yet to initiate such programmes. It is realized that in African countries south of the Sahara, and in some Asian countries, malaria eradication is not practicable at present. Nevertheless, even in those countries it will be necessary to undertake organized antimalarial activities aimed at reducing the malaria transmission to a level at which important socio-economic development may take place. With this in mind, WHO is carrying out a field research project in the north of Nigeria on the epidemiology of malaria in holoendemic (savannah) areas of Africa and on the possibilities of its control. In addition, the Organization is holding an inter-regional conference for countries where malaria eradication is not practicable, which will take place in Brazzaville later this year, with the objectives of defining the possibilities for undertaking malaria control activities in different countries, reviewing the methodology as well as the research requirements and indicating lines of future action within the existing basic health services.