UNITED NATIONS

ECONOMIC AND SOCIAL COUNCIL

LIMITED
E/ICEF/L.806
9 August 1955
ORIGINAL: ENGLISH

UNITED NATIONS CHILDREN'S FUND

Programme Committee

Recommendation of the Executive Director for an Apportionment

SUDAN

Anti-Malaria Campaign[a/]

1. The Administration recommends an apportionment of $34,000 to the Sudan for insecticides, sprayers, laboratory equipment and transport to extend one area covered by the Sudan's anti-malaria work. This would be in the Blue Nile province where 500,000 people in the Gezira irrigated area are already covered, and it is proposed to cover an additional 200,000 in the surrounding area during 1956. The Government would increase its expenditure in malaria control by the equivalent of $70,000, to a total of $170,000 equivalent.

2. This is recommended as the first year of what is intended to be an expanding eradication campaign. Discussions have started about extending the additional coverage to 500,000 people in 1957 and 1,000,000 in 1958. However, the working out of a plan of operations for eradication depends on the visit of a WHO malariologist which is to take place in the second half of 1955. The Administration expects to make a recommendation to the next session of the Board for aid to this project if an eradication plan is agreed on.

The malaria problem in the Sudan

3. The Sudan, with its very large area of about 2,674,000 square kilometres, is a sparsely inhabited country, its population of 8,764,048 showing an overall density of about 3.3 inhabitants per square kilometre. About 2,843,000 people, however, are concentrated in a very limited area, along the banks of the Nile and in the Gezira district. In these parts of the country the density of the population rises to an average of about 100 persons per square kilometre. Owing to the geographical position of the country, which extends

a/ First request for aid to this programme

/from .....

from 3°45' to 21°50' latitude North, climatic conditions are not uniform. Modifications of rainfall, relative humidity, and temperature occur progressively from south to north and the climate passes from the equatorial to the desert type.

4. Malaria is one of the chief health problems in the Sudan. It is the principal cause of sickness of the population and is thus responsible for its major loss of agricultural efficiency. Malaria is also a cause of many still-births and, especially in the south, of high infant mortality. During the past four years about 1,128,081 malaria cases attended the hospitals' dispensaries, and dressing stations; this means that half of the total population in the relevant area received treatment for malaria. According to the records of the year 1951-1952 malaria represents 5.2 per cent of the total number of new cases treated, being followed by trachoma 3.5 per cent and syphilis 2.9 per cent.

5. Due to the variation from south to north of four main factors, namely: rainfall, rise and fall of the Nile, irrigation, general temperature and humidity, the character of malaria differs considerably from one part of the country to the other. Anopheles gambiae is the main vector species of the Sudan. Plasmodium falciparum is the prevalent parasite throughout the entire country and is widely dominant both in the northern and southern areas.

6. The distribution of malaria morbidity over the nine provinces of the Sudan is shown by the following figures, which have been computed by comparing the ratio of treated cases against the provincial population:

Province	Area square kilometres	Population	Malaria morbidity
Northern province	460,000	715,549	2.7%
Khassala province	343,000	788,230	2.8%
Bahr el Chazal province	212,000	770,964	9.6%
Blue Nile province	140,000	1,840,582	4.6%
Darfur province	490,000	1,005,570	1.7%
Equatoria province	195,000	632,891	4.1%
Khartoum province	23,000	486,420	2.8%
Khordofan province	375,000	1,671,626	2.5%
Upper Nile province	236,000	852,216	1.3%

/Present malaria control .....

Present malaria control

7. Malaria control in the Sudan has passed through all the phases of technical progress so that it can be said that all the devices which are known to be beneficial in reducing the effects of the disease have been employed in different parts of the country, in varying degrees. Up to 1951, the main emphasis was on anti-larval measures. However, some experiments were carried out in 1949 and 1950 with the spraying of insecticides, and from 1951 onwards this method was used more widely. Residual spraying operations are now widely used in perimeter spraying of major towns, in small towns, in some rural areas, in the major cotton cultivation schemes, and whenever conditions of exceptional epidemic risk suggest it. Larval control measures are still used on a large scale. The bulk of the anti-malaria operations is presently centred in the Blue Nile Province and in the Northern Province, in view of their economic importance which is due mainly to cotton production in irrigated areas. It is roughly estimated that a population of 3,000,000 was directly protected during the year July 1953 to June 1954, as a result of measures against either the larva or adult mosquito.

Plans of the Government for future malaria work

8. The Government wishes to expand malaria operations first of all in two main areas:

a) the Northern Province,

b) the Blue Nile Province

9. The Northern Province, between the Egyptian border and the Khartoum province, in the strip of cultivated land along the Nile, has a population of about 715,000. At the request of the Government, a WHO malariologist visited this area in November-December 1954 for which, in June 1954, the Government had already requested assistance from UNICEF and WHO. The course of developments was changed, however, due to exceptional height of the flow of the Nile during August, September and October of that year. The Egyptian Government, fearing a second anopheles gambiae invasion of Upper Egypt similar to that of 1942, offered the Sudan Government assistance in a spraying campaign to be carried out

/along the banks of the Nile..

along the banks of the Nile south of the frontier up to the fourth cataract. As there was a risk of epidemic outbreak, this was accepted by the Sudan Government and spraying operations were carried out between September 1954 and February 1955. It is the intention of the Government to continue malaria control operations in this area in subsequent years. International technical assistance is being solicited and the possibility of requesting UNICEF assistance may arise later if developments so require.

10. The Blue Nile Province is to a great measure the centre of the wealth of the Sudan, as it contains the Gezira irrigated area, which is the seat of a most intensive and profitable cultivation of cotton. There is every prospect that the economic importance of the province will be greatly intensified when new irrigation works higher up the Blue Nile are put in hand. There is a very lively appreciation in the Sudan of the health consequences of alterations in the water balance of the countryside, and the authorities wish to take all possible steps to avoid a repetition of some of the undesirable by-products which followed the start of the original Gezira irrigation in 1925, especially as regards malaria resulting from the increase of anopheles thus stimulated. An immediate consequence of the new irrigation work will be vastly to increase the breeding grounds for the main malaria vector in the province: A. gambiae and perhaps also A. pharaoensis and A. rufipes which are also present. Clearly a circumstance of great danger will be created for increased malaria transmission unless proper precautions are taken.

11. The total population of the province amounts to some two million people, one and a half million of whom live outside the Gezira irrigated area. That area has been under continuous agricultural development for thirty years and as a result has been an all-weather road system; it has also a prosperous economy and a health department organized as a separate and semi-autonomous unit of the provincial health service. This unit affords protection against malaria by a twice-yearly residual spraying with gammexane.

12. In 1951, before residual spraying started, 3,200 cases of malaria were reported in the Gezira irrigated area. In 1954, the third year of residual spraying, there were only 600 cases reported. The extent of the activities

/are shown by the following figures.....

are shown by the following figures:

Quantity of gammexane used during 1954	lbs.	170,000
Total number of rooms sprayed (each approximately 500 sq. ft.)		265,000
Total sum spent for insecticides and transport (out of which £E 4,000 for labour)	£E	18,650
No. of mosquito men		115
No. of Sanitary Overseers		7
No. of spraying cycles per annum		2
No. of vehicles (lorries)		8

13. It is the intention to continue malaria control by these means in the Gezira area. Economically the area can afford the cost, and there is every hope that the control can be rendered more absolute. The authorities are conscious that they have been proceeding somewhat empirically and they wish to increase the amount of scientific malariology being done. Unfortunately, the Sudan Government does not have suitable staff for this work, and it is therefore proposed that international staff required to assist in starting the malaria control in the remainder of the Blue Nile province will also include the Gezira area in their sphere of activities.

14. In the remainder of the Blue Nile province, with a population of approximately 1,500,000, attempts have been made at malaria control and the Provincial Health Officer can mobilize 50 3-man spray teams. These efforts have been hindered by the great difficulty of doing two sprayings with gammexane during the rainy period. In 1954, 75,000 malaria cases were known to the authorities. The Government's plan for the future is to concentrate the malaria control efforts on the areas which will be first affected by new irrigation, and to extend the work by stages from these areas as a base. It is for the malaria control work in these areas that UNICEF and WHO assistance is now being requested by the Government.

/14. A study .....

15. The transmission season occupies the four months from mid-July to mid-October. During those four months movement around the province (the present Gezira irrigation area excepted) is difficult owing to the rains. If protection is to be given to the population by residual spraying, the work should be completed by mid-July and its efficacy must persist until the end of the transmission season.

16. As has been suggested above, the new irrigation work will greatly increase the malaria danger because of the increase of the vector species. It is therefore logical, before that increase takes place, to take all possible steps to reduce the vector's chances of finding an infective blood diet.

17. This means starting malaria control now - while factors favour control and before the human population is greatly increased. Insofar as it is possible at this stage to make an estimate, there must be from 3 to 5 years available to the health authorities to secure a good basis of control before any large scale change will take place in insect-human ecology as a result of irrigation.

18. The Government would propose, if it can obtain the necessary assistance, to extend protection outside the Gezira area to an additional 200,000 people in 1956, expanding to 500,000 in 1957 and 1,000,000 in 1958. The Gezira irrigation area, around which the project would extend, is a potential central core for eradication. Natural barriers exist to the north-east and north-west in the shape of semi-desert regions which are only sparsely inhabited. The main expansion of the project will be to the south and west, where once again there is a natural limiting barrier in the

semi-desert and "qoz" sand areas of northern Kordofan Province. To the east lie the mountains of Ethiopia, where only the river valleys give danger of re-infection. It is to the south that one must look in order to find the exposed flank of the area it is proposed to protect. Though the Blue Nile Province is largely made of the dry central clay plain which stretches over its border in the southern part into Kordofan and Upper Nile Provinces, it is touched at one point by the flood plain region of the Upper Nile, which is an excellent mosquito breeding ground. It will be necessary to investigate how large a danger of re-infection this presents, and what barrier steps will be necessary. It would be wrong to make too much of this at the moment because the Upper Nile Province is not densely inhabited, and the swamp country does not actually extend into the area where control is proposed.

19. A WHO malariologist will be visiting the Sudan in the second half of 1955 to investigate and discuss with the Government the general strategy for eradication, and to help prepare a plan of operations for the next few years.

20. The Administration considers that it would be wiser to await the results of this work before considering allocations for 1957 and a plan extending into later years. However, aid to extend coverage over an additional 200,000 people in 1956 is recommended now, in order to allow this work to start as proposed by the Government in the first half of 1956. Otherwise, another year will be lost, one of the few remaining before irrigation aggravates the problem. Moreoever a Government request (since modified) has been outstanding since June 1954. WHO gives its technical approval to this 1956 extension; the Organization also expects the large plan to be successfully prepared later in 1955 and is ready to contribute technical assistance for its execution.

/Plan of operations....

Plan of operations

21. A fully detailed plan of operations will be prepared following the visit of a WHO malariologist in the second part of 1955. Based on initial studies by WHO, UNICEF and Government representatives, however, and with the technical approval of WHO malaria experts, it is proposed to extend spraying operations in the Fung area of the Blue Nile Province to cover an additional 200,000 persons. It is proposed to use an insecticide which offers good protection through a single spraying carried out before the rainy season. Dieldrin is therefore being proposed with the possibility of transfer to another insecticide should further technical study on the spot show it to be desirable. International help would be wanted not only for supplies and equipment but also for the provision of trained staff, and WHO is therefore expected to provide one malariologist and one entomologist. These staff will make their advice available to the Gezira area also.

22. Corresponding Sudanese staff of good general experience will work with the international staff so as to gain specialized experience necessary for later independent work. A total of 100 field men will be available.

UNICEF commitments

23. UNICEF is requested to provide the following:

a)	Dieldrin, 50% wettable dispersible 15,000 lbs		$17,000
b)	Sprayers, 100		2,500
c)	Transport: 4 Landrovers 4 x 4		8,000
d)	Laboratory Equipment		2,000
		Contingencies	1,500
		Freight	3,000
	Total:		$34,000

/ Note on supply requirements:....

Note on supply requirements:

a) Insecticides and sprayers: Pending final details to be agreed when the plan of operations is concluded on the basis of the WHO expert's visit, the above calculations are based on a dosage of 0.6 grs. of technical insecticide per square metre applied to an average surface area of 45 square metres per room. There are approximately two persons per room.

b) Transport: In 1956 the Government will provide 8 trucks for transport of personnel and supplies. The 4 vehicles requested from UNICEF will be used for supervisory duties.

WHO Commitments

24. The WHO Regional Office for the Eastern Mediterranean has participated in the planning of this programme and the project has the technical approval of WHO which will provide the following personnel out of Technical Assistance funds:

a) 1 short-term consultant malariologist in 1955.

b) 1 malariologist and 1 entomologist for the whole of 1956 and 1957.

c) 1 fellowship for one year in malariology or entomology, in each of the years 1956 and 1957.

b) and c) are subject to supply assistance being available to make the project possible.

Government commitments and matching

25. Estimated expenditure by the Government during 1956 in carrying out its anti-malaria programme is £ 170,000 out of which £ 25,000 ($70,000) would be new expenditure.

Target time schedule

26. The first year's insecticides, sprayers and vehicles are requested for arrival in the Sudan early in 1956.