

WORLD HEALTH
ORGANIZATION

ORGANISATION MONDIALE
DE LA SANTÉ

INTER-REGIONAL CONFERENCE ON MALARIA
FOR EASTERN MEDITERRANEAN AND
EUROPEAN REGIONS

WHO/Mal/164
29 March 1956

ORIGINAL: ENGLISH

Provisional agenda item 1.2



USE OF VOLUNTARY LABOUR IN ANTIMALARIA OPERATIONS ✓

by

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1. THE PROBLEM

1.1 Despite the fact that DDT spraying has brought down the cost of malaria control to a very low level, many of the under-developed countries are still not in a position to undertake protective measures in all the malarious areas in their territories. In these circumstances, aid from international agencies in the shape of insecticides, sprayers and advisory services free of cost is particularly valuable inasmuch as it helps such countries to extend malaria control to sectors which they could not have covered from their own resources. Nonetheless, such help devolves a proportionate increase in the allocation of national funds. In course of time, therefore, they reach their financial limit and are unable to extend malaria control measures any further.

1.2 Another aspect of the situation which the national authorities have to keep in view is that they cannot expect such international assistance to go on forever. They must, therefore, exercise due care in keeping their commitments within bounds which they can afford should the international aid be withdrawn. At the same time, the need for controlling malaria in the country is so urgent and pressing that the public is naturally inclined to suspect the motives of the Government in refusing international aid on grounds of potential difficulties in the future.

1.3 This at least was the situation in the former province of the North-West Frontier in Pakistan when malaria control was first planned on a province-wide basis with the help of international organizations. It was felt that the Provincial Government, if

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obliged to do so, may be prevailed upon to increase the existing figure for antimalaria budget by twenty per cent., whereas the cost of insecticides and sprayers, if paid out of national funds, would involve an increase in annual allocation by forty to fifty per cent. The problem was how to provide for this contingency and at the same time carry malaria control to the maximum possible limit. One solution that suggested itself was to effect the necessary economy by utilizing voluntary labour. The manner in which such labour was organized and fitted into the malaria control programme of the North-West Frontier and the extent to which it could be successfully utilized elsewhere forms the subject of this paper.

2. BACKGROUND INFORMATION

2.1 The former province of the North-West Frontier, exclusive of the Frontier States and Tribal Areas, covered an area of about 14 000 square miles and had a population of about three and one quarter millions. For administration it was divided into six districts, namely, Hazara, Mardan, Peshawar, Kohat, Bannu and Dera Ismail Khan situated in the above order along the provincial axis running from north-east to south-west.

In its physio-geographic features it presented a sharp contrast between the mountainous and submontane tracts of the Hazara district in the north and the semi-desert district of Dera Ismail Khan in the south. Between these two extremes of terrain lay the Peshawar Vale containing an extensive irrigation system and large perennial rivers and the dry, rocky valleys of Kohat and Bannu which possess relatively minor patches of irrigated fields that form isolated oases.

In the mountainous valleys and the submontane tracts of the Hazara district malaria prevailed in a static and hyperendemic form as also in irrigated areas wherever they occurred. Over the rest of the province, particularly the dry zones of the southern districts, the severity of malaria varied from year to year, sharp epidemics supervening periodically in years of heavy rainfall. Because of the low atmospheric temperatures, the Hazara district experienced an early malaria season from July to mid-September. In the Peshawar, Kohat and Bannu districts, the season began and ended two to three weeks later than in the Hazara district, whereas in the southernmost district of Dera Ismail Khan, active transmission usually started in the first week of August and continued up to mid-November.

3. DEVELOPMENT OF MALARIA CONTROL IN RURAL AREAS

Rural malaria control was first started in a heavily irrigated section of the Kohat-Hangu valley in 1949 when a medical officer assisted by a team of expert technicians was deputed by the Malaria Institute of Pakistan to survey the valley and to organize sprayings of the malarious villages with DDT suspension. The Malaria Institute staff not only carried out DDT sprayings of 55 villages with an approximate population of 45 000, but also trained the local technicians who have given regular treatment to the area ever since. As a result, villages in this valley which in 1949 had spleen rates ranging between 31.8 and 72.3 per cent., had, by 1955, rates between 0 and 5 per cent.

In 1952, the malaria control programme was extended to two other highly malarious rural tracts in the Hazara district comprising a total of 137 villages and a population of about 125 000. It was, however, in 1953 that the attempt was made to organize DDT spraying in all the six districts of the province. The policy followed that year was to restrict sprayings to groups of villages forming the endemic foci. In 1954 and 1955, with the help of voluntary labour, it was possible to include villages in a widening circle around each focus until most of the treated areas coalesced to form large continuous tracts covering a major portion of the province.

4. ORGANIZATION OF VOLUNTARY LABOUR

The scheme for using voluntary labour in malaria control began in 1953 when a batch of students of the Islamia College, Peshawar led by Professor M. Close decided to undertake DDT sprayings in a group of villages in the Hazara district as a part of their programme of community social service in summer holidays. Emulating the example of the College students, the boys of a high school in that neighbourhood also offered their services for the same purpose. They were all given the necessary instructions in spraying technique by the Malaria Inspector in charge of the area who also arranged for the supply of DDT powder and sprayers.

Although the area treated by these students was not extensive it served an extremely useful purpose in focussing attention on the potentialities of utilizing schoolboys for DDT spraying on a large scale. In 1954 a comprehensive plan was

drawn up based on practical field experience of the preceding year. The main feature of the scheme was that each school was deputed to treat a specified circle of villages within its easy reach. The intention was to render the transportation of boys unnecessary and thereby eliminate a relatively heavy item of expenditure.

It must be emphasized that the entire scheme was worked out in close consultation with the Education Department. Indeed, had it not been for the whole-hearted co-operation of the Director of Public Instruction, it is doubtful if the scheme could have been a success. He addressed the headmasters of all the schools in the province pointing out the role they were to play in the spraying programme and arranged for the contingents of boys and supervising teachers from each school to receive training at specified school centres on specified dates. The Health Department, on its part, supplied the training staff and shifted the necessary supplies of insecticides and sprayers to convenient sites which had been selected in consultation with the local educational authorities. All these activities pertaining to planning, training of students and dumping of supplies were completed well in advance of the malaria season and before the schools closed for summer holidays on 30 June.

As a safeguard against possible failure of the scheme, the policy in 1954 was that sprayings in endemic foci would be undertaken by paid labour. In 1955 this cautionary approach was not necessary and student volunteers were allowed to carry out sprayings wherever they could conveniently manage. As a result they covered a much larger area that year than in 1954. In addition a good beginning was made with yet another source of voluntary labour, namely, the Extension Services. This is a governmental organization whose function is to promote, through specially trained workers, the idea of self-help amongst villagers for effecting improvements in agricultural practices, developing cottage industries etc. and instituting sanitary measures on modern lines. The organization is, however, still in its early phases and for want of a sufficiency of trained workers, has been able to bring only a limited section of the province under its programme. Nonetheless, it is to the credit of the Extension Services that they were able to persuade the villagers to carry out sprayings in all the areas where trained workers were operating. This augurs well for the future, as, once DDT spraying is taken up by the Extension Services as a routine item on their programme, it will solve many of the problems that now beset rural malaria control in Pakistan.

5. RESULTS

The economy in expenditure effected by voluntary labour can be readily observed from a study of Table I which gives figures for protected population and funds expended or allocated each year from 1953 to 1955.

TABLE I

Year	Population protected	Funds allocated or expended in Rupees	Per capita cost in	
			Annas	US cents
1953	492 580	108 790*	3.33	2.53
1954	1 186 066	92 230**	1.24	0.94
1955	1 483 155	91 586**	0.99	0.75

* actual expenditure

** annual allocation

Figures for per capita cost given in the above Table I are exclusive of the cost of DDT and sprayers which were supplied free by the UNICEF and the United States Government Aid Organization. If these items were included at the prices prevailing in Pakistan, the figures for per capita cost would be as set out in Table II.

TABLE II

Year	Per capita cost in	
	Annas	US cents
1953	4.99	3.80
1954	2.21	1.68
1955	1.90	1.44

A breakdown of the figures for protected population indicated in Table III brings out the extent to which voluntary labour contributed to the extension of spraying operations.

TABLE III

Year	Total population protected	Population protected by			Population protected by voluntary labour	
		Paid labour	Student volunteers	Village volunteers	total	per cent.
1953	492 580	447 580	45 000	-	45 000	9.1
1954	1 186 066	526 118	617 704	42 244	659 948	55.6
1955	1 483 155	187 213	1 024 745	271 197	1 295 942	87.4

Another advantageous feature of the scheme was the short space of time in which the student volunteers were able to complete their spraying programme. Thus during July and August 1955, no less than 856 632 persons were protected by them out of a total of 1 024 745 which means that they carried out 83.6 per cent. of their spraying operation in two months. This is extremely desirable in a country where malaria season is short and where it is essential to undertake the simultaneous spraying of a large number of villages spread over a vast area.

6. SPLEEN RATES

The results of splenic surveys carried out early in 1956 of 477 villages in the different districts are shown in Table IV.

TABLE IV

Total number of villages surveyed	Number of villages with spleen rates (1956)				
	0 per cent.	1 to 5 per cent.	6 to 10 per cent.	11 to 20 per cent.	above 20 per cent.
477	205 (43.0)	122 (25.6)	69 (14.5)	52 (10.9)	29 (6.1)

Note: Figures in brackets denote the percentage of villages in each category.

From a study of Table IV it will be seen that only 17 per cent of the villages had spleen rates exceeding 10 per cent. The exact significance of this finding would have been clearer had it been possible to present comparable figures for 1954 and 1955, which, unfortunately, are not available at present. To give some idea of the improvement effected, reference may, however, be made to the state of affairs in 35 villages all of which had spleen rates above 10 per cent. before DDT spraying began in 1953. The same villages examined a year later after one treatment with DDT through paid labour, still showed spleen rates exceeding 10 per cent. in 20 villages, i.e. 57.1 per cent. On the whole, it would, therefore, be safe to assert that DDT spraying through voluntary labour was probably as effective as with paid labour.

7. DISCUSSION AND SUMMARY

The description of actual experiences in the former province of the North-West Frontier shows that voluntary labour can be successfully used for carrying out extensive DDT spraying operations. The student community there proved to be the best source of volunteers. Nonetheless, it is felt that when the villagers develop a spirit of self-help through the efforts of the Extension Services they are likely to bear more and more the burden of such activities in the future.

In organizing voluntary labour it is essential that:

- (a) the health department obtains the complete co-operation of the other governmental departments concerned in the effort;
- (b) a detailed plan is drawn up and supplies of insecticides and sprayers are placed in carefully selected sites well in advance of the malaria season;
- (c) adequate arrangements are made for the training of volunteers in spraying technique;
- (d) every encouragement is given to individuals who are in a position to inspire the community with a desire to do social service.

It must be mentioned that there were a number of factors which greatly favoured the scheme in the North-West Frontier province. In the first place, the malaria season being short only one treatment with DDT was sufficient to control malaria.

Secondly, the summer holidays of schools and colleges happened to coincide with the months most suitable for spraying. Thirdly, the province had excellent road and rail communications which facilitated the timely transportation of supplies to the remote corners of the province.

It cannot be claimed that voluntary labour can be utilized in any and every country. Under favourable conditions, however, there is no reason why such labour could not be organized for DDT spraying elsewhere. Indeed, considering the meagre incomes of the malarious and under-developed countries, this may be the only way open to them to tackle rural malaria control on a country-wide basis. Thus, estimates based on expenditure figures for 1953 when voluntary labour was negligible in the North-West Frontier province, it would have been necessary to provide about three to three and a half times the funds sanctioned for 1954 and 1955, if paid labour was employed for controlling malaria in the population actually protected in those years. Such an allocation was certainly beyond the economic capacity of the province.