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PRESENT STATUS OF MALARIA CONTROL IN ASIA

F. J. DY, M.D.

Regional Malaria Adviser, Regional Office for the Western Pacific, World Health Organization

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SYNOPSIS

The author summarizes the information given by 13 governments —Afghanistan, Burma, Ceylon, China, India, Indonesia, Malaya, Netherlands New Guinea, Philippines, Portuguese India, Sarawak, Thailand, and Viet Nam—on their existing and proposed malaria-control programmes in response to a questionnaire prepared by WHO for discussion at the First Asian Malaria Conference, which was held in Bangkok in September 1953.

Although in late 1953 nearly 46.5 million of the 271 million people living in malarious regions were protected against the disease, more than 224 million others were still unprotected.

It is noted that residual-insecticide spraying—the basis of most campaigns—has significantly reduced spleen- and parasite-rates ; that the minor opposition to spraying initially encountered in some places quickly disappeared as the benefits became apparent ; that malaria control has resulted in general improvements in public health and has promoted socio-economic development ; that anopheline resistance to the insecticides used has not been observed; that ten governments voiced the need for indoctrination of public officials concerning malaria control ; and that there is a trend among governments to make financial provision for long-term malaria-control schemes.

The First Asian Malaria Conference, which was held under the auspices of the WHO Regional Office for South-East Asia in Bangkok from 21 to 24 September 1953, was attended by delegates from 14 countries in the Eastern Mediterranean, South-East Asia, and Western Pacific Regions, as well as representatives from the United Nations Children's Fund (UNICEF), the South Pacific Commission, and WHO.

The conference discussed the following points :

1. Present status of malaria control
2. Organization, methods, and financing of the programmes
3. Planned development of national malaria-control programmes
4. Regional co-ordination of long-term programmes.

In an effort to obtain information to guide the conference in discussing the many problems related to the items on the agenda, WHO sent a questionnaire to the governments who had been invited to send delegates. Replies were received from 13 governments (Afghanistan, Burma, Ceylon, China, India, Indonesia, Malaya, Netherlands New Guinea, Philippines, Portuguese India, Sarawak, Thailand, and Viet Nam). These replies were duplicated and distributed to the delegates and observers several weeks before the conference.

The following is a summary of the replies to the questionnaire received from the 13 governments referred to above. An effort has been made to tabulate and compare the information supplied.

It is interesting to note that, as of late 1953, although nearly 46.5 million of the 271 million people living in malarious regions had been protected against the disease, more than 224 million, out of a total population of about 554 million in these 13 countries, were still unprotected. While some of the governments have organized national malaria-control programmes, others have not yet been fortunate enough to do so, chiefly because of lack of adequate funds or of trained personnel.

The following points also emerge from the replies received :

1. National malaria-control programmes have been based chiefly on residual insecticidal methods.

2. Significant reductions in the spleen- and parasite-rates have followed one or more residual-spraying operations.

3. In general, householders have not objected to residual spraying ; minor opposition or apathy turned to enthusiasm after the first spraying campaign, as a result of propaganda and demonstration of direct and collateral benefits.

4. Malaria control has resulted in general improvements in the field of public health and has promoted socio-economic development.

5. No resistance of anopheline mosquitos to the insecticides so far applied has been detected.

6. Ten of the 13 governments voiced the need for indoctrination of public officials as regards malaria control.

7. There is a trend among governments to make financial provision for long-term malaria-control schemes.

Populations Protected

Country	*Total population*	*Population in malarious regions*	*Population directly protected*	*Population still to be protected*
Afghanistan . . .	12,000,000	2,000,000	700,000	1,300,000
Burma	17,000,000	7,500,000	1,147,665*	6,390,335
Ceylon	8,103,648	3,100,000	3,100,000	nil
China (Taiwan) . .	8,128,374	5,000,000	1,500,000	3,500,000
India	361,822,255	200,000,000	30,000,000	170,000,000
Indonesia	80,000,000	30,000,000	1,250,000	28,750,000
Malaya	5,506,447	**	2,000,000	3,500,000
Netherlands New Guinea . .	1,500,000	750,000 1,000,000 (875,000) †	10,000	740,000 990,000 (865,000) †
Philippines	20,000,000	6,670,000	667,000	6,000,000
Portuguese India . .	637,806	111,000	33,500	77,500
Sarawak.	546,385	††	6,000	540,000
Thailand	18,700,000	5,000,000	3,000,000	2,000,000
Viet Nam	20,000,000	4,550,000	3,000,000	1,550,000
TOTAL	553,944,915	270,852,000	46,414,165	224,472,835

* Includes 109,665 people protected in WHO-assisted malaria-control demonstration project in Lashio area.

** Few parts are free from malaria.

† Average or estimated figure used.

†† With few exceptions, all parts of the country are potentially malarious.

Prevalent Type of House and Practices interfering with Residual Deposit

Afghanistan

Type of walls. Mud ; rough, with cracks ; very absorbent.
Lime-washing. Only in a few better-class houses.
Replastering. Rare.
Remarks. Ceiling of mud resting on straw mats, dry leaves and twigs. Houses lack essential ventilation and natural light owing to severe winter.

Burma

Type of walls. Bamboo.
Lime-washing. No information.
Replastering. No information.
Remarks. Thatched roofs. Houses rest on four legs.

Ceylon

Type of walls.	Mud ; rarely of bricks or stone.
Lime-washing.	Yearly in urban areas.
Replastering.	Two or three times a year in rural areas.
Remarks.	Thatched roofs ; few brick houses have tiled roofs.

China

Type of walls.	Bamboo, plastered most popular ; then brick or mud. Wooden walls common in eastern coastal area.
Lime-washing.	Occasionally in brick or plastered houses.
Replastering.	Practically none.
Remarks.	Thatched or tiled roofs. General house-cleaning conducted every spring and fall.

India

Type of walls.	Mud in rural areas ; bricks in urban areas.
Lime-washing.	At least yearly.
Replastering.	Fairly frequent.
Remarks.	Thatched roofs.

Indonesia

Type of walls.	Split bamboo.
Lime-washing.	Done in some areas.
Replastering.	None.
Remarks.	Regular repair of bamboo walls amounts annually to an important percentage of the wall surface.

Malaya

Type of walls.	Brick or concrete in towns ; wood, split bamboo or palm-leaf in rural areas.
Lime-washing.	Colour-washed in towns ; not in rural areas.
Replastering.	None.
Remarks.	Little or no interference by local practices with insecticide deposit.

Netherlands New Guinea

No information.

Philippines

Type of walls. Largely bamboo, nipa palm, or cogon.
Lime-washing. None.
Replastering. None.
Remarks. Thatched roofs. Houses fairly open and airy. Common practice to clean walls frequently by dusting, washing, or rubbing with " sandpaper " leaves.

Portuguese India

Type of walls. Mud ; few houses have masonry walls.
Lime-washing. None.
Replastering. None.
Remarks. Thatched roofs, which are changed yearly owing to monsoon.

Sarawak

No information.

Thailand

Type of walls. Generally of wood or bamboo ; leaf mats and bricks occasionally.
Lime-washing. None.
Replastering. None.
Remarks. Bamboo and leaf walls are rebuilt or replaced every year or two. With sub-floor space for storage and/or livestock.

Viet Nam

Type of walls. Mud, with or without paddy-straw, and palm leaves in rural areas ; brick in urban areas.
Lime-washing. In urban areas ; rarely in rural areas.
Replastering. No information.
Remarks. Palm leaves used for roof in rural areas. Bamboo walls and thatch roof used in mountain villages.

Significant Opposition to House-Spraying Programme and Measures to Overcome Objections

Afghanistan

Objections made. At first the people objected, but apathy turned to enthusiasm after first spraying because of disappearance of mosquitos, flies, etc.

Reasons for objections. Strict purdah custom and resentment of intrusion of coolies with strange-looking equipment.
Measures adopted. Demonstration of beneficial effects of residual spraying.

Burma

No objections.

Ceylon

Objections made. No opposition at commencement of programme in 1946, but during past two or three years some objections have been made.
Reasons for objections. Feeling that malaria has disappeared and therefore people did not wish to be inconvenienced nor to have their walls disfigured by DDT. Ineffectiveness of DDT-spraying against culicine mosquitos.
Measures adopted. Propaganda and education of the people. Legislation in form of regulations has been adopted, but resorted to only in extreme cases.

China

No objections.

India

No objections worth mentioning. Objections overcome by persuasion.

Indonesia

Objections made. No opposition in rural areas ; in towns, householders are sometimes difficult. (Reasons not specified and no measures adopted.)

Malaya

Objections made. Only minor opposition.
Reasons for objections. Unsightly deposit from wettable powders on unpainted wood.
Measures adopted. Changed to emulsion.

Netherlands New Guinea

No information.

Philippines

Objections made. Little opposition encountered. Those who refused at first requested spraying after seeing the benefits in their neighbours' houses.

Portuguese India

No objections.

Sarawak

No information.

Thailand

Objections made. No significant opposition.
Measures adopted. Explanation of importance of programme ; public education and information. There exists a Malaria Act, but this has not been invoked to obtain public co-operation.

Viet Nam

No objections.

Transmission Season and Vector Species

Country and region	*TRANSMISSION SEASON (inclusive)*			*VECTORS*		
	begins	*peak*	*ends*	*species*	*gut*	*gland*
Afghanistan						
Leghman	May		June	*A. superpictus*		positive
	July	September	September	*A. superpictus*		positive
				A. culicifacies		positive
Kundus-Khanabad	Mid-July		Mid-October	*A. superpictus*		positive
Kabul	July	Mid July-August	September	*A. superpictus*		positive
Burma						
	June	Some areas with transmission throughout the year	November	*A. minimus* *A. culicifacies* *A. sundaicus*	positive pre-war infection reported	positive
Ceylon						
Dry zone (includes two-thirds of the country affected by the north-east monsoon)	October	Some areas with transmission throughout the year	March	*A. culicifacies*	positive	positive
Wet zone (south-west quadrant of Ceylon)		This zone is healthy, but is liable to epidemic malaria where it adjoins the intermediate zone				

Country and region	*TRANSMISSION SEASON (inclusive)* *begins*	*peak*	*ends*	*VECTORS* *species*	*gut*	*gland*
Intermediate zone	May		June	*A. culicifacies*	positive	positive
	October		March	*A. culicifacies*	positive	positive
China						
Central Taiwan	May		June			
Northern Taiwan	July		August	*A. minimus*	positive	positive
				A. hyrcanus sinensis		questionable
Eastern Taiwan	July		August			
Southern Taiwan	October		November			
India						
Punjab	1st week of July	1st week of October	End of October	*A. culicifacies*		
Western Uttar Pradesh*	,,	,,	,,	*A. culicifacies* and *A. fluviatilis*		
Delhi	,,	,,	,,	*A. culicifacies*		
Rajputana (Rajasthan)	,,	,,	,,	*A. culicifacies*		
Madhya Pradesh	,,	,,	,,	*A. culicifacies* and *A. fluviatilis*		
Eastern Uttar Pradesh	1st week of August	End of October	Mid-December	*A. culicifacies*		
Bihar	,,	,,	,,	*A. culicifacies*		
Bengal	,,	,,	,,	*A. philippinensis*, *A. minimus*, and *A. sundaicus*		
Bombay except north Kanara	,,	,,	,,	*A. culicifacies*, *A. fluviatilis*, and *A. stephensi*		
Assam and submontane Bengal	(*a*) Mid-March	End of June	Mid-July	*A. minimus* and *A. leucosphyrus*		
	(*b*) Mid-August	End of October	End of November			
Madras State						
(*a*) Western Ghats and Nilgiris (also Coorg and Nilgiris)	Mid-January	1st half of June	1st week of July	*A. fluviatilis*		
(*b*) Central districts (Coimbatore, Salem, North Arcot, Chitoor, and Ceded districts, namely, Anantpur, Cuddapah, Curnool, and Bellary, and also Mysore)	Beginning of August	December	Beginning of March	*A. culicifacies* and *A. fluviatilis*		
(*c*) Coastal districts north of Madras	Beginning of September	Mid-December	Beginning of January	*A. sundaicus*, *A. annularis*, *A. fluviatilis*, and *A. culicifacies*		
(*d*) Coastal districts south of Madras	End of November	1st half of June	Mid-March	*A. fluviatilis* and *A. culicifacies*		

* In Terai, transmission occurs throughout most of the year.

Country and region	*TRANSMISSION SEASON (inclusive)* *begins*	*peak*	*ends*	*VECTORS* *species*	*gut*	*gland*
India (continued)						
(*e*) Foot-hills area along the Western Ghats	January		June	*A. fluviatilis*		
Orissa						
(*a*) Hilly region	Throughout the year	October, November, March, April		*A. fluviatilis*, *A. varuna*, and *A. minimus*		
(*b*) Plains	July	October	November	*A. annularis*		
(*c*) Coastal	Throughout the year except in June			*A. sundaicus*		
Mysore State						
(*a*) Malnad area (districts of Kadur, Shimoga, parts of Hassan and Mysore)	March to June		3-8 months	*A. fluviatilis*		
(*b*) Irrigation tracts	Practically throughout the year			*A. fluviatilis* and *A. culicifacies*		
Travancore southern districts	January		June	*A. fluviatilis* and *A. varuna*		
Indonesia						
No data on transmission seasons in different areas	Transmission season not definite; may go on throughout the year			Principally : *A. sundaicus;* also :		positive
				A. aconitus		,,
				A. hyrcanus		,,
				A. maculatus		,,
				A. subpictus		,,
Malaya						
Hilly areas	Throughout the year	March-July	Throughout the year	*A. maculatus*		positive
Plains	Throughout the year	September-December	Throughout the year	*A. letifer*		positive
				A. barbirostris		,,
				A. umbrosus		,,
Brackish water zone	Throughout the year	September-December	Throughout the year	*A. sundaicus*		positive
Netherlands New Guinea	In general, perennial transmission occurs.					
Southeastern part	January		May	*punctulatus* group	positive	positive
South of mountain range				*punctulatus* group	positive	positive
				A. bancrofti bancrofti	,,	,,
Philippines	Transmission seasons vary with different types of climatic conditions which occur in the islands.			Principally : *A. minimus* *flavirostris*	positive ,,	positive ,,
				Secondarily : *A. mangyanus* *A. maculatus*	,,	,,
Portuguese India						
Goa	December		Mid-June	Principally : *A. flavirostris*	positive	positive
				Secondarily : *A. culicifacies*	,,	,,

Country and region	*TRANSMISSION SEASON (inclusive)* *begins*	*peak*	*ends*	*VECTORS* *species*	*gut*	*gland*
Sarawak						
	Transmission season not yet fully determined.			*A. leucosphyrus balabacensis*		positive
Thailand						
	Transmission goes on throughout the year in all regions of Thailand, with major transmission generally coincident with the rainy season.					
		June-October		*A. minimus*	positive	positive
				A. culicifacies	negative	negative
				A. maculatus	,,	,,
				A. sundaicus	,,	,,
Viet Nam						
Low coastal (littoral) region		Not stated		*A. subpictus*		positive**
				A. ludlowi var. *sundaicus*		,,
Delta zones		Not stated		*A. sinensis*		positive**
				A. nigerrimus		,,
				A. tesselatus		,,
				A. vagus		,,
Intermediate ("terraces ") zones		Not stated		*A. minimus*		positive**
				A. vagus		,,
				A. aconitus		,,
Hilly country		Not stated		*A. minimus*		positive**
				A. aconitus		,,
				A. jeyporiensis		,,
Mountainous zones and plateaux		Not stated		*A. minimus*		positive**
				A. maculatus		,,
				A. jeyporiensis		,,
				A. aconitus		,,

** Mentioned with natural infection in the report ; presumed to be gland positive.

Evaluation of Campaign

A. Criteria for Evaluation of Results of Campaign

Country	*Spleen-rate*	*Parasite-rate*	*Infant parasite-rate*	*Malaria-morbidity*	*Adult mosquito density*	*Larval checking*	*Others: entomological or chemical*
Afghanistan	Used	Used	Used	Survey in the area ; also data from hospitals.	*	*	*
Burma	Used	Used	Used	Data from hospitals (diagnosed clinically)	Used	Used	Precipitin test, bionomics.
Ceylon	Used [1]	Used [2]	Used [3]	Data from hospitals and dispensaries.	Used	Used	*
China	Used	Used	Used	Fever-case survey bi-weekly or monthly.	Used	Used	Alessandrini test, biological test.
India.....	Used	Used	Used	Data from hospitals and dispensaries.	Used	Used	Survival-rate of mosquitos caught in window traps ; sporozoite-rate.
Indonesia .	Used	*	Used	*	*	*	*
Malaya [4] ..	Used	Used	Used	Data from dispensaries.	Used	Used	*
Netherlands New Guinea	*	*	*	*	*	*	*
Philippines.	Used	Used	Used	Used	Used [5]	Used	Dissection, survival-rate, Alessandrini test, precipitin test, bionomics.[6]
Portuguese India....	Used	Used	*	Used	Used	Used	*
Sarawak [7] .	Used	Used	Used	Data from travelling dispensaries.	Used	Used	Dissection, bionomics, etc.
Thailand ..	Used	Used	Used	Antimalarial drugs given to people with clinical symptoms of malaria.	Used	Used	Dissection.
Viet Nam .	Used	Used	*	*	*	*	*

* Not mentioned

[1] Among schoolchildren under 12 years of age

[2] Among schoolchildren during spleen survey

[3] Bi-annually, starting in 1951

[4] This information refers only to the experiment conducted by the Institute for Medical Research.

[5] Indoors and outdoors

[6] Used in malaria pilot project in Mindoro (information received from project leader)

[7] This information was supplied by the project leader of the Sarawak malaria pilot project after the conference.

B. *Malariometric Indices and Entomological Observations of Interest in Areas now under Control, before and after Control, and Health Statistics illustrating Degree of Control achieved.*

Afghanistan

Area	*Year*	*Time*	*Spleen-rate (%)*		*Infant parasite-rate (%)*	
			sprayed zone	*unsprayed zone*	*sprayed zone*	*unsprayed zone*
Leghman	1949	After 1st spray	62.0	89.1	8.3	70.0
	1952	After 3 spray seasons	10.3	85.5	nil	no record
Kundus-Khanabad	1951	After 2 spray seasons	15.4	58.8	0.8	11.4

Pulkhumari : In this area the work was started in the year 1948. After four years of anti-malaria operations, the spleen index dropped from 76% to 9% in 1952. The average enlarged spleen fell from 2.34 to 1.6 during this period.

Burma (Data from malaria-control demonstration project, Lashio area)

(*a*) *Malariometric data*

	Spleen-rate (%)	*Parasite-rate (%)*	*Infant parasite-rate (%)*
Before operations	90.0	26.5	35.2
After 1st year's operations	66.0	3.7	0.0

Data from two Government Hospitals : The average number of malaria cases (clinically diagnosed) from July to December for the years 1948-51 was 828; during the same period in 1952 (within the first year after spraying) 424 cases were diagnosed—a reduction of 49%.

(*b*) *Entomological data*

The average vector density per man-hour in the 10 months following the first year's spraying was :

Sprayed area	0.16
Unsprayed area	17.30
Vector density during initial survey	10.7 in houses 3.1 in cowsheds
Anthropophilic index	36.0%

Ceylon

Spleen- and Parasite-Rates and Vital Statistics in Ceylon during the Period 1936-52 (Residual Spraying Started in 1946)

Year	*Spleen-rate* *	*Parasite-rate* *	*Estimated population*	*Malaria morbidity per 1,000*	*Malaria mortality per million*	*Birth-rate*	*Death-rate*	*Rate of natural increase*	*Maternal death-rate*	*Infant death-rate*
1936	30.6	—	5,631,000	523	1,352	34.0	21.8	12.2	21.6	166
1937	—	—	5,712,000	404	770	37.7	21.7	16.0	19.9	158
1938	—	—	5,810,000	353	820	35.8	21.0	14.8	20.1	161
1939	18.2	5.1	5,897,000	544	1,701	35.9	21.7	14.1	18.2	166
1940	—	—	5,951,000	574	1,532	35.7	20.6	15.1	16.1	149
1941	18.4	3.7	6,020,000	535	1,180	36.4	18.7	17.7	15.3	129
1942	—	—	6,021,000	536	851	36.6	18.5	18.0	14.4	120
1943	—	—	6,134,000	349	1,098	40.4	21.3	19.1	13.3	132
1944	—	—	6,276,000	266	888	36.9	21.2	15.7	13.7	135
1945	—	—	6,496,000	391	1,310	36.6	21.9	14.7	16.5	140
1946	—	—	6,695,000	413	1,873	38.2	20.2	18.0	15.5	141
1947	10.3	—	6,879,000	212	661	39.3	14.3	25.0	10.6	101
1948	5.8	0.6	7,100,000	109	471	40.5	13.2	27.3	8.3	92
1949	2.7	0.2	7,297,000	100	328	39.8	12.6	27.2	6.5	87
1950	1.2	0.1	7,547,000	81	252	40.4	12.6	27.8	5.6	82
1951	0.8	0.16	7,743,000	58	206	40.5	12.9	27.6	5.8	82
1952	0.6	0.14	7,942,000	34	—	—	—	—	—	—

* Spleen and parasite surveys conducted during March

China

Spleen-, Parasite-, and Infant Parasite-Rates and Malaria Morbidity Data: In sprayed and unsprayed areas of demonstration area in Taiwan

	Completely sprayed area		*Selectively sprayed area*		*Check area*	
	number examined	*rate per cent.*	*number examined*	*rate per cent.*	*number examined*	*rate per cent.*
1. Spleen-rate						
(*a*) Pre-operation . . .	1,687	52.28	651	82.95	1,419	44.47
(*b*) Post-operation . . .	1,875	31.63	682	54.40	1,396	53.58
2. Parasite-rate						
(*a*) Pre-operation . . .	1,935	23.04	762	33.86	1,452	20.32
(*b*) Post-operation . . .	1,884	11.52	684	17.84	1,465	25.73
3. Infant new infection (parasite-rate)						
(*a*) Pre-operation						
July 1952	211	12.32	105	15.38	144	12.50
(*b*) During operations						
August	219	8.22	97	6.19	175	8.00
September	199	3.02	103	1.94	172	4.07
(*c*) Post-operation						
October 1952 . .	186	0.54	102	0	178	5.62
November	186	2.15	100	1.00	170	5.29
December	192	1.04	112	0.89	167	8.98
January 1953 . .	206	0	129	0.78	147	4.76
February	191	0	120	0	144	1.39
March	199	0.50	120	0.83	141	0
April	182	0.55	130	0	144	0.69
May	192	0	135	0	153	0.65

4. Fever-case survey	*Completely sprayed area*		*Selectively sprayed area*		*Check area*	
	number visited	*cases per 1,000* *	*number visited*	*cases per 1,000* *	*number visited*	*cases per 1,000* *
(*a*) During operations						
August 1952 . . .	3,405	20.3	2,641	20.8	4,557	20.8
September	3,099	10.0	2,675	16.1	3,888	16.7
(*b*) Post-operation						
October 1952 . .	4,225	10.5	2,812	17.4	4,014	10.7
November	4,083	5.9	2,502	19.9	4,255	24.4
December	4,748	3.4	2,808	16.7	4,299	23.7
January 1953 . .	4,544	5.5	2,728	12.1	4,111	21.4
February	4,742	5.9	2,714	10.7	3,915	13.5
March	4,647	5.4	2,748	10.9	4,627	6.9
April	4,191	4.5	2,887	11.1	4,302	6.7
May	4,603	4.1	2,817	4.6	4,298	10.5

India

Spleen-Rates and Malaria Cases before and after Institution of Malaria-Control measures: Delhi State

	Urban			*Rural*	
	1946	*1952*		*1945*	*1952*
Malaria cases	27,868	3,434	Malaria cases . . .	18,344	3,574
Cumulative spleen-rate	2.1%	0.16%	Spleen-rate	22.9%	5.3%

* Malaria fever cases found per 1,000 persons visited. Blood smear of each fever case examined.

Indonesia

No data submitted.

Malaya

Spleen- and Parasite-Rates among Children before and after 3 Years of Spraying in an Experimental Area

	Before spraying			*After 3 years' spraying*		
	number examined	*spleen-rate (%)*	*parasite-rate (%)*	*number examined*	*spleen-rate (%)*	*parasite-rate (%)*
DDT area	480	66	40	529	19	6
BHC area	170	60	32	183	21	6
Comparison area . . .	337	54	28	354	32	10

The sprayed areas also showed a low incidence of malaria in patients attending outdoor dispensaries, and a lower rate of primary malaria in infants examined once a fortnight from birth until the end of the experiment. In these areas spraying had no perceptible effect on general health statistics.

Entomological data are inconclusive. The figures in the table which follows suggest that there was some reduction in the numbers of the vector adult mosquitos, but larval surveys did not show any reduction in breeding.

Average Number of Anopheles maculatus Caught per Two Men per Night: March-June.

	1950	*1951*	*1952*
DDT	0.3	0.5	0.1
BHC	0.7	2.5	0.2
Comparison	2.8	4.7	0.8

Netherlands New Guinea

No data submitted.

Philippines

Results of Spleen and Parasite Surveys in the Demonstration and Comparison Areas:
Demonstration areas sprayed for the first time in May-June 1952

Period of survey	*Demonstration area*			*Comparison area*		
	number examined	*spleen-rate (%)*	*average spleen*	*number examined*	*spleen-rate (%)*	*average spleen*
April-May 1952	1,389	76.95	1.4	1,078	52.37	0.79
March-April 1953 . . .	1,350	32.37	0.57	1,159	56.9	0.76

Period of survey	*Demonstration area*		*Comparison area*	
	number examined *	*parasite-rate (%)*	*number examined* *	*parasite-rate (%)*
April-May 1952	1,340	41.6	1,076	33.8
March-April 1953	1,343	4.6	1,150	28.0

Malaria transmission, as judged from infant parasite-rates, shows that none of the 352 infants born after spraying in the demonstration area showed infection, while 34% of the 185 infants born in the corresponding period in the comparison area showed malaria parasites in the blood.

The vector density in the sprayed houses remained almost nil, while it remained high in the houses in the comparison area.

* Age-group, 2-14 years

Portuguese India

Spleen-Rates before and after Malaria Campaigns

Goa —	Before campaign (1948)	80%
	Now (1953)	4%

		Spleen-rate (%)	*Parasite-rate (%)*
Canacona and Sanguem —	Before campaign (1950) . . .	50-71	4-17
	Now (1953)	5-6	1

The incidence of clinical malaria is now very insignificant. In Canacona, the increase of the population registered during 1951 and 1952 exceeds the total increase registered in the previous 10 years.

At present, the prevalence of mosquitos in the sprayed areas is negligible. There has also been a general decline of insect-borne diseases, such as enteric fever, diarrhoea, dysentery, and infantile gastro-enteritis. Subsequently, there was general improvement in the health of the people. Vast unhealthy areas are now free from malaria and the population can work better and stay longer in the field, and the effects are reflected in the improvement of agriculture and mining.

Sarawak

No data submitted.

Thailand

The principal malaria carrier, *A. minimus*, which occupies 20%-30% of the houses in unsprayed villages in malarious areas, is virtually eliminated in sprayed villages, from both the houses and the environs. The usual malaria parasite-rates of 20%-30% or more among people in malarious areas are regularly reduced in sprayed villages to less than 10% within a few months after the first spraying, and both the malaria parasite-rate and the spleen-rate continue to decline sharply through succeeding years. Among infants in unsprayed villages malaria parasite-rates are commonly 10%-20%, while among infants born in sprayed villages the rates are less than 1%, indicating an almost complete cessation of transmission.

Viet Nam

No data submitted.

General Improvements in Public Health and in Social and Economic Conditions resulting from Malaria Control

In *Afghanistan*, the yield of cotton crop in Kataghan was increased immensely, following malaria control, and in Leghman area, the rice yield has increased much more than it used to be before malaria control was started in the area.

In *Ceylon*, the state of public health has improved considerably since the inauguration of malaria control, particularly in the dry zone, where one sees healthy young children growing up and playing their part in the development of the country. The successful control of malaria has enabled the Government to undertake land development in the dry zone. Food

production and other agricultural pursuits were very unpopular prior to 1946. But since malaria has been controlled, there is " land hunger " among the people and the Government is unable to cope with the demand for more land for agricultural pursuits.

Plague has been effectively controlled by DDT residual spraying of houses in such provinces in *India* as Bombay, Mysore, and Madras.

Although figures for the general improvement of public health following malaria control are rarely available, it has been noted in *Indonesia* that there has been obvious economic improvement in estates and increased food production in some rural areas. A better school attendance has also been observed.

In the *Philippines*, general observations indicate an overall improvement in the health of the people in sprayed areas ; it has also been noted that there is a greater tendency for people to colonize new areas under control. Highway and other construction projects receive lower contract bids in areas where malaria control has been undertaken.

The benefits of malaria control in *Thailand* have done much to stimulate public thinking on health programmes and to encourage public co-operation with other health programmes. The general health of the people has been considerably improved and much less time has been lost from school and work because of sickness. The effects of malaria control in relieving the country of an enormous drain on the productive energy of the people which has been a great deterrent to social and economic development may be appreciated from the following example :

> Surveys in Chiengmai, Lampoon, and Chiengrai Provinces in northern Thailand showed that, in sprayed areas, 7.2% of the people were found positive for malaria parasites, while in the uncontrolled areas, 25.2% were positive. It was estimated that out of about 282,000 people in these sprayed areas, approximately 71,000 persons would have been expected to suffer from malaria during the year had there been no control work; whereas it is likely that residual spraying would have reduced this figure to about 20,000 cases. This represents a reduction of more than 50,000 cases in a population of 282,000. If no more than one-half of the preventable cases should represent a significant loss in productive labour, it is evident that at least 25,000 weeks (it has been noted that about one week's activity is lost on the average by each malaria case) were probably saved in an area of less than one-tenth of the present protected population.

Central Thailand was highly malarious and largely underdeveloped a few years ago; now, since malaria control has been undertaken, it is a

thriving agrarian centre, inviting new settlers where they could not have been induced to establish homes under previous conditions.

In *Viet Nam*, it was reported that following malaria control the mortality- and spleen-rates dropped, the social conditions improved, and the output increased.

Development of Resistance to Insecticides

None of the governments reported that the anopheline mosquitos in their countries had developed resistance to the insecticides so far applied.

Under experimental conditions, *Culex fatigans* has been found to develop resistance to DDT in India. In Burma, Ceylon, Indonesia, and the Philippines, there were impressions (unconfirmed scientifically) that culicines have developed a certain amount of resistance to DDT.

The Philippines and Portuguese India reported that the house-fly (*Musca domestica*) appears to have developed some resistance to DDT, particularly in areas where this toxicant has been extensively used for a number of years. India, on the other hand, reported that there was no evidence that this insect had developed resistance in that country.

Afghanistan, China, Malaya, Thailand, and Viet Nam reported that so far no evidence of resistance in any insect has been observed in connexion with their respective residual-spraying programmes.

Need for Increased Facilities for Training Personnel of Various Grades

The training facilities in the Philippines and those that have been planned in Burma are reported to be adequate.

In Indonesia, the training facilities are adequate, but the greatest difficulty is the lack of enthusiasm among medical personnel for public-health work, particularly malaria-control work (owing, largely, to the relatively greater income that can be derived from private practice).

In Ceylon, China and Thailand, the training facilities for technicians and malaria inspectors are reported to be adequate, but these countries felt that specialized training of key personnel abroad would be required.

Afghanistan, India, and Malaya reported that training facilities for different grades of personnel are needed, but these countries did not state whether their existing facilities need to be increased. Portuguese India reported that an additional medical officer should be trained, in order to extend the work to Diu district.

It is reasonable to expect that increased training facilities for all grades of personnel will be required in Netherlands New Guinea and Sarawak, where government malaria-control services have been started fairly recently.

Need for Indoctrination of Public Officials as regards Malaria Control

The need for indoctrination of public officials as regards malaria-control has been felt in Afghanistan, Ceylon, China, India, Malaya, Netherlands New Guinea, the Philippines, Sarawak, Thailand and Viet Nam.

Burma, Indonesia, and Portuguese India replied that there is no need for such indoctrination of their respective public officials.

Organization of Programmes

Afghanistan

Provincial malaria-control teams come directly under the President of the Malaria Organization.

Malaria teams or units

Five provincial malaria-control teams, composed of :

1 director (medical officer)
5-13 malaria inspectors
0-4 insect collectors
5-13 foremen
20-52 spraymen
10-26 coolies
1 entomologist attached to one of the teams.

Composition of squad :

1 foreman
4-8 spraymen
2 coolies.

Transport :

1-2 jeeps
1-3 lorries.

Population covered :

Not specified.

Burma

Proposed organization : Malaria-control branch, under the Public-Health Section of Directorate of Medical and Health Services, directed by a Chief Malariologist. The branch will supervise six regional organizations, each composed of a malariologist, an assistant malariologist, an entomologist, laboratory technicians, and attendants.

Malaria teams or units

Plan : 9 units in 1952-3 ; 27 in 1953-4 ; 74 in 1956-7 ; composed of :

1 malaria inspector
5 supervisors
40 spraymen (5 months).

Composition of squad :

Not specified.

Transport :

Not specified.

Population covered :

100,000 per team.

Ceylon

The Superintendent of the Antimalaria Campaign is under administrative control of the Deputy Director (Public-Health Services) of the Ministry of Health, and is responsible for the direction, supervision, and execution of all malaria-control works. The Superintendent is assisted by five medical officers, one entomologist, and one malaria engineering assistant.

The whole country is divided into four regions, with the medical officer in charge of each region responsible for the entire malaria control.

Malaria teams or units

Each region has a number of malaria-control units and malaria investigation units composed of :

1 public-health inspector
A number of minor supervisors
10-12 labourers.

Composition of squad :

Not specified.

Transport :

1 truck or jeep for each mobile unit.

Population covered :

100-240 houses per day, per team.

China

The Director of the Taiwan Malaria Research Institute, under the Commissioner of Health of Taiwan, is in charge of all malaria-control activities,

Operational functions are carried out through prefectural health centres. township offices, and local health stations down to the spraying squads.

Supervision is undertaken by supervisors and field instructors from the Malaria Institute.

All operational expenses except DDT and sprayers are paid by townships, which provide New Taiwan dollar (NT$) 1.— per capita from general taxation to meet expenses for labour, accessory equipment, etc.

Malaria teams or units

Field units or squads form the basis for operational activities. Townships with an average population of 25,000 are the basic administrative units for field operations. Several units or squads operate in each township.

Composition of squad :

1 foreman (60 days)
4 spraymen (60 days)
2 coolies (60 days).

Transport :

Variable : provided by townships.

Population covered :

7,000 per squad.

India

The central organization is under the Director of the Malaria Institute of India, who is administratively under the Director General of Health Services of the Ministry of Health.

The operational part of the national control programme is the responsibility of various States. The Centre will arrange for supplies, co-ordinate operations, and assess the results achieved during the first phase (three years) of the national programme, and afterwards the entire responsibility will rest with States.

Malaria teams or units

Number not given, but each is composed of :

1 medical malaria officer
4 senior malaria inspectors
4 malaria inspectors
3 supervisory field workers
10 field workers
20 superior field workers (5 months)
110 field workers (5 months).

Composition of squad :

1 superior field worker
4 field workers
1 porter.

Transport :

1 jeep
4 trucks, plus transport which may be available locally.

Population covered :

1,000,000 per team.

Indonesia

The Malaria Institute, which is a section of the Ministry of Health, is in charge of malaria-control activities. It is envisaged that decentralization will be effected when more key personnel become available.

Three branches of the Institute operate in Djocja (Middle Java), Surabaya (East Java), and Makassar (Sulawesi, Celebes).

In each of the 10 provinces of Indonesia, except Kalimantan (Borneo), there are one or more spraying centres with local squads working under central supervision.

Malaria teams or units

No real field teams exist. A foreman supervises not more than 6 squads. Several foremen are supervised by a technical administrator.

Checking and research are done by local malaria mantris (technicians), who work under central supervision.

Spraying and technical personnel operate the whole year round.

Composition of squad :

1 headman
1 headman's helper
5 spraymen.

Transport :

Supervisors use jeeps ; other personnel use bicycles.

Population covered :

Not specified.

Malaya

As with the older control methods, spraying campaigns remain the responsibility of district health officers, under the general direction of the State heads of the Medical Department. A large amount of antimalaria

work is carried out by commercial firms, rubber estates, tin mines, etc., for the protection of their employees.

A Malaria Advisory Board, first set up in 1911, performs the functions of disseminating information and advice about control methods and of recording the incidence of malaria. Officers of the Institute for Medical Research act as its technical advisers.

Netherlands New Guinea

A central malaria service, with a malariologist as head, and with headquarters at Hollandia, has been started recently. This service is training a small staff to enable the Government to start a DDT pilot project. The experience gained in the pilot project, and other considerations, will be used in organizing a more extensive campaign. It is roughly estimated that the following personnel will be needed :

3 officers with university degrees (malariologist, entomologist, and sanitary engineer)
2 laboratory supervisors
20 laboratory assistants
2 technicians
100 field team labourers
10 field team supervisors
15 others.

It is roughly estimated that the following equipment and supplies will be needed when the campaign is undertaken :

8 vehicles
150 sprayers
20-30 tons of insecticides per year.

Philippines

The Malaria Control Division is under the Department of Health. The Chief of the Division and his administrative staff have headquarters in Manila. Responsibility for technical direction, budget and fiscal matters, and equipment and supplies is centralized in the headquarters office. Technical supervision is, however, decentralized by the use of three area field supervisors, each of whom reports to the chief field supervisor in Manila. Under each field supervisor are the field units, each of which is under the direction of a head malariologist.

Malaria teams or units

25-30 field units, which are expected to be reduced to about 20 units as a permanent complement of the Division. The units are composed of :

1 malariologist
1 sanitary engineer
1 entomologist
1 field foreman
5 technicians
5 field attendants
40 skilled labourers (150 days)
60 labourers (100 days).

Composition of squad :

1 skilled labourer
2 or 3 labourers (spraymen).

Transport :

6 jeeps plus 2 trailers
1 pick-up truck
1 station wagon
1 power wagon
2 outboard motors
5 bicycles.

Population covered :

36,000 houses (approximately 180,000 people), per season, per unit.

Portuguese India

The malaria organization functions under superior guidance of the Director of Health Services who plans and supervises the antimalaria activities. His office arranges for the provision of necessary supplies in the field.

Four field teams conduct the actual malaria-control operations. Each is headed by a health officer trained in malariology, who is responsible for survey and control operations in addition to his duties as health officer.

Malaria teams or units

4 field teams composed of :

1 health officer (who does other public-health work besides malaria control)
1 spraying squad.

Composition of squad :

2 or 3 supervisors
Necessary field workers.

Transport :

Jeep, or motor-cycle, or public transport bus.

Population covered :

Not specified.

Sarawak

The responsibility for the control of malaria, as well as for that of other diseases, rests with the Medical Department. A WHO-assisted malaria pilot project is now in operation. It is expected that the experience gained from the pilot project will be helpful in the development of a distinct malaria-control service in the Medical Department.

Thailand

The Division of Malaria and Filariasis Control of the Department of Health, Ministry of Public Health, has 10 medical officers and 150 technical assistants. The latter are formed into technical field teams during surveys and supervise spraying squads during operations.

The work is carried out through four regional offices, each with a number of principal field headquarters.

All technical work is supervised by medical officers and field officers stationed at various headquarters.

Malaria teams or units

12 principal headquarters composed of :

5 technical assistants
15 foremen
45 spraymen
15 porters.

Composition of squad :

1 foreman
3 spraymen
1 porter.

Transport :

1 jeep or Land-Rover, or jeep pick-up, per survey team. Bicycles when required. (Transport for squads not mentioned).

Population covered :

100,000 per team.

Viet Nam

Antimalaria measures are undertaken by the Government in collaboration with the Foreign Operations Administration (FOA). The management of malaria teams is carried out at the national level by a Director of Malaria Control and a specialist in medical entomology. At the area level, one inspector is assigned, together with a deputy inspector, one or more laboratory teams (3 technicians and 1 coolie), and sub-area survey teams (2 nurses

or technicians, 1 secretary and driver). At the provincial level, spraying teams are assigned.

Malaria teams or units

Number not given but each is composed of :

1 team leader
5 spraymen
1 driver.

Composition of squad :

1 leader
1 driver
1 mixer
1 porter
Spraymen

Transport :

1 truck or tender.

Population covered :

Not specified.

Methods of Control

Afghanistan

Spraying equipment used :

Lofstrand and Hudson sprayers; stirrup pumps.

Insecticide formulations :

DDT water-dispersible powder, 50% or 75%.

Number of sprayings per year : 1

Methods used to protect towns :

Antilarval measures are used in Kabul against anopheles and other mosquitos.

Part played by other methods :

No information given.

Antimalarial drugs used :

Not used for the control of malaria.

Burma

Spraying equipment used :

Hudson sprayers with " T " jets No. 8002.

Insecticide formulations :

DDT and BHC suspension and emulsion.

Number of sprayings per year : 1

Methods used to protect towns :

Residual spraying with emulsion.

Part played by other methods :

No antilarval work done.

Antimalarial drugs used :

No information given.

Ceylon

Spraying equipment used :

Four Oaks (Ross-type) sprayers with special agitator.

Insecticide formulations :

Previously, DDT solution and emulsion. Now, DDT water-dispersible powder 75% and BHC w.d.p. 50%.

Number of sprayings per year :

1949 : 8-9
1950 : 6-7
1951 : 6-7
1952 : 5-6

Methods used to protect towns :

Residual spraying.

Part played by other methods :

Antilarval methods abandoned since 1945.

Antimalarial drugs used :

Only for treatment of malaria in hospitals and dispensaries. No suppressive treatment.

China

Spraying equipment used :

Hudson " 710 Industro "; Lofstrand and Smith compression sprayers.

Insecticide formulations :

DDT w.d.p. 75%.

Number of sprayings per year : 1

Methods used to protect towns :

Towns have very low malaria rates. Residual spraying carried out in certain instances.

Part played by other methods :

None used.

Antimalarial drugs used :

155 antimalaria stations examine blood smears and treat positive cases.

India

Spraying equipment used :

Stirrup pumps are mainly used. Compression sprayers are used when available.

Insecticide formulations :

DDT emulsion and suspension (50% and 75%), also BHC.

Number of sprayings per year :

Two in rural areas of Delhi State, where residual spraying is the only method employed; only one in certain villages in this State.

Methods used to protect towns :

Antilarval measures are favoured, but residual spraying is resorted to in some urban areas. (Permanent engineering works have improved the sanitation and narrowed the scope of antilarval work.)

Part played by other methods :

Not mentioned.

Antimalarial drugs used :

Quinine is being distributed by some States. The national malaria programme will use the 4-aminoquinoline group in the treatment of clinical malaria. Four million tablets will be distributed in 1953-4.

Indonesia

Spraying equipment used :

Hudson sprayers with some Galeazzi sprayers.

Insecticide formulations :

DDT w.d.p., 75%.

Number of sprayings per year : 1

Methods used to protect towns :

Permanent sanitation, sometimes with larvicidal measures and DDT residual spraying.

Part played by other methods :

Other methods are applied only on a small scale.

Antimalarial drugs used :

Quinine is distributed during malaria epidemics and serious seasonal rises of malaria endemicity. Drug prophylaxis is used only for some specific groups (4-aminoquinoline, such as Nivaquine).

Malaya

Until 20 years ago, control was mainly effected by antilarval methods. A gradual change to suppression with drugs was manifest in some areas before the second World War, and, since 1946, many estates have come to rely on suppression with proguanil or other synthetic drugs as the main method of control.

Methods used to protect towns :

Antilarval measures.

Part played by other methods :

No information given.

Antimalarial drugs used :

Antimalarial drugs are used extensively.

Netherlands New Guinea

A malaria pilot project is about to be started, and the results will be used in planning the extension of the campaign to other parts of the country.

Methods used to protect towns :

Oiling of breeding-places.

Part played by other methods :

Drainage and larvae control by oiling have been successful in Sorong.

Antimalarial drugs used :

Paludrine prophylaxis is compulsory for members of the Armed Forces. There is no compulsory drug prophylaxis for civilians but many people use it.

Philippines

Spraying equipment used :

Hudson Climax Jr. sprayers.

Insecticide formulations :

DDT w.d.p., 75%. DDT solution in kerosene used in a few instances only.

Number of sprayings per year : 1

Methods used to protect towns :

Big towns are usually not malarious and therefore are rarely treated.

Part played by other methods :

Where applicable, sanito-agronomic modifications, stream improvement, automatic siphons, etc., are employed. However, these constitute less than 5% of the total programme.

Antimalarial drugs used :

These are used only to treat clinical cases and as suppressive treatment for road-construction crews and other workers in malarious areas.

Portuguese India

Spraying equipment used :

Stirrup pump and compression sprayers.

Insecticide formulations :

DDT emulsion.

Number of sprayings per year :

1950-1 : 1-3
1952-3 : 4

Methods used to protect towns :

None ; towns are malaria-free.

Part played by other methods :

Filling, drainage, use of predacious fish, and larviciding with DDT or Paris green.

Antimalarial drugs used :

Paludrine prophylaxis is used in Old City of Goa. In other places, paludrine is used only for the treatment of cases.

Sarawak (Information given only on pilot project.)

Spraying equipment used :

Lofstrand sprayers with " T " jets No. 8002.

Insecticide formulations :

DDT suspension ; BHC suspension and emulsion. (Dieldrin to be used also.)

Number of sprayings per year :

DDT : 2
BHC : 4

Methods used to protect towns :

No information given.

Part played by other methods :

No information given.

Antimalarial drugs used :

No information given.

Thailand

Spraying equipment used :

Lofstrand and Hudson sprayers.

Insecticide formulations :

DDT w.d.p., 75%. DDT emulsion used in few instances. BHC and BHC-DDT combinations have been tried experimentally in limited areas.

Number of sprayings per year : 1

Methods used to protect towns :

Residual spraying.

Part played by other methods :

None used.

Antimalarial drugs used :

The residual-spraying programme has been supplemented by the distribution of chloroquine through hospitals, health units, and other authorized treatment centres. More than four and a half million tablets have been issued to these agencies.

Viet Nam

Spraying equipment used :

Hudson sprayers; Shukuntani (Japanese) sprayers.

Insecticide formulations :

DDT w.d.p., 75%.

Number of sprayings per year : 2

Methods used to protect towns :

Drainage. DDT is reserved for unhealthy areas.

Part played by others methods :

None used.

Antimalarial drugs used :

Quinine, Paludrine, Premaline, and chloroquine are used. Details are not given of their use in conjunction with the malaria-control campaign but mention is made that, on one day a week, 3 chloroquine tablets are given to children of 12-15 years of age. Decreasing doses are administered to younger children.

Future National Malaria-Control Plans

Population expected to be protected

Country	*1953*	*1954*	*1955*	*1956*	*1957*
Afghanistan	300,000	400,000	500,000	—	—
Burma	900,000	2,700,000	—	7,400,000	--
Ceylon [1]	—	—	—	—	—
China	1,503,000	5,000,000	5,000,000	—	—
India	90,000,000	125,000,000	125,000,000	—	—
Indonesia [2]	5,000,000	8,000,000	11,000,000	14,000,000	17,000,000
Malaya	—	—	—	—	—
Netherlands New Guinea	30,000	—	—	150,000	—
Philippines	750,000	5,250,000	5,250,000	5,250,000	1,000,000*
Portuguese India [3]	5,000	15,000	15,000	15,000	15,000
Sarawak	—	—	—	—	—
Thailand	3,000,000	3,500,000	3,500,000	2,000,000	1,000,000
Viet Nam	—	—	—	—	—

[1] Island-wide scheme of residual spraying was completed October 1947. Present work is maintenance of spraying.

[2] These totals will be increased to 20 million in 1958 ; 23 million in 1959 ; 26 million in 1960 ; and 30 million in 1961.

[3] At the end of 1957, it is expected to protect about 100,000 people, including 33,500 already protected

* 1958 : 1,000,000.

Distribution of Costs

Afghanistan

Antimalaria organization and campaign :

Financed by contributions from industrial concerns and from the Government.

Long-term plans for maintenance and expansion :

Financial provision made.

Proportion of costs borne by various authorities :

Central Government : 34%
Municipalities : nil
Industrial concerns : 66%.

Community participation :

Industrial concerns make financial contributions.

Malaria taxation :

None levied, as it is not feasible.

Burma

Antimalaria organization and campaign :

Financial arrangements not specified.

Long-term plans for maintenance and expansion :

Budgeted for periods 1952-3 to 1956-7.

Proportion of costs borne by various authorities :

Not specified.

Community participation :

No information given.

Malaria taxation :

No information given.

Ceylon

Antimalaria organization and campaign :

Financed by central government in annual budget.

Long-term plans for maintenance and expansion :

Financial provision made.

Proportion of costs borne by various authorities :

Municipal and local authorities do not participate in cost.

Community participation :

None since residual spraying in use.

Malaria taxation :

None levied. It would be most unpopular.

China

Antimalaria organization and campaign :

The present programme is financed by the Taiwan Government with assistance from the Joint Commission on Rural Reconstruction (JCRR), FOA*/China, WHO, and townships.

Long-term plans for maintenance and expansion :

Financial provision made.

Proportion of costs borne by various authorities :

Approximately 25% of actual spraying costs are financed by townships.

Community participation :

Townships have provided NT$ 1 per capita to meet local expenditure for labour, travel, and miscellaneous expenses.

Malaria taxation :

No taxation specifically levied for malaria control but townships allocate NT$ 1 per capita from general taxation.

India

Antimalaria organization and campaign :

Has been financed solely from State budgets. In the national malaria-control programme, the central government will provide, with FOA aid, about two-thirds of the cost, and the States one-third.

Long-term plans for maintenance and expansion :

Financial provision made.

Proportion of costs borne by various authorities :

See above.

Community participation :

Some States have employed voluntary labour with unsuccessful results.

* Foreign Operations Administration of the United States of America.

Malaria taxation :

Might have to be adopted in some States (as an improvement tax) for maintenance programme after termination of bilateral aid.

Indonesia

Antimalaria organization and campaign :

Financed by central government and provinces. DDT and sprayers procured by FOA.

Long-term plans for maintenance and expansion :

No real financial provision made for long-term plans because the budget is approved annually.

Proportion of costs borne by various authorities :

Not specified.

Community participation :

None. As a rule, private concerns do their own malaria-control work.

Malaria taxation :

None. It would not be feasible.

Malaya

Antimalaria organization and campaign :

Financial provision not specified.

Long-term plans for maintenance and expansion :

Financial provision not specified.

Proportion of costs borne by various authorities :

Not specified

Community participation :

A great deal of anti-malaria work is carried out by private firms.

Malaria taxation :

None.

Netherlands New Guinea

Antimalaria organization and campaign :

Financed by the government.

Long-term plans for maintenance and expansion :

No financial provision made but government's annual budget would provide enough funds for the campaign if the pilot project should be successful.

Proportion of costs borne by various authorities :
Not specified.

Community participation :
Not specified.

Malaria taxation :
None. It would not be feasible.

Philippines

Antimalaria organization and campaign :
Financed by central government, with assistance from FOA.

Long-term plans for maintenance and expansion :
Financial provision made.

Proportion of costs borne by various authorities :
The six-year programme is financed entirely by the central government with FOA assistance. After this programme, it is hoped that some provincial and municipal support will be provided.

Community participation :
Some municipalities give voluntary labour, but this is negligible.

Malaria taxation :
None.

Portuguese India

Antimalaria organization and campaign :
Financed by the government.

Long-term plans for maintenance and expansion :
A five-year plan has been made and this includes provision for malaria control.

Proportion of costs borne by various authorities :
All expenses are met by provincial government.

Community participation :
None.

Malaria taxation :
None. It would be possible to levy taxation in certain industrially developed areas.

Sarawak

A malaria pilot project is in progress. No details given.

Thailand

Antimalaria organization and campaign :
Financed by government with assistance from FOA.

Long-term plans for maintenance and expansion :
Financial provision made.

Proportion of costs borne by various authorities :
All expenses are met entirely by the central government.

Community participation :
Some cities provide labour. Villages may provide houses and storage space during campaign.

Malaria taxation :
None.

Viet Nam

Antimalaria organization and campaign :
Financed by the government and FOA.

Long-term plans for maintenance and expansion :
Financial provision not yet planned.

Proportion of costs borne by various authorities :
Not specified.

Community participation :
None.

Malaria taxation :
None. It is not feasible at present.

COST ESTIMATES OF CAMPAIGNS PER YEAR *

Country and year	Supervising staff	Labour	Supplies	Equipment	Transport	Miscellaneous expenses	Total cost	Cost per capita protected directly	Cost per capita protected directly and indirectly	Cost per capita of total population
Afghanistan (1952)							1,707,799	4.1	—	3/20 or US$ 0.15
Burma (1953)	20,000	18,500	98,000	3,100	7,300	6,100	153,000	1.45 kyats or US$0.31	—	—
Ceylon (1952)	651,567	592,604	1,452,553	10,000	212,103	365,101	3,283,931	1.06	0.41 or US$ 0.09	0.41 or US$ 0.09
China (1952)	33,865	76,414	233,273	5,376	8,147	10,079	367,155	2.46	0.046	
India (year not specified)	9,21,960	10,13,140	30,00,000	1,32,200	4,77,278	2,51,400	57,95,978	0/5/2	0/2/7	0/2/7
Indonesia (1952—only in one area with 86,000 population)	15,600	67,200	96,000	6,000	17,000	3,000	204,800	2.38 or US$ 0.21	—	—
Malaya (1952—pilot project for 4,200 people only)	892	3,574	3,768	232 (includes transport)			8,466	1,96 or US$ 0.65	—	—
Netherlands New Guinea **	—	—	—	—	—	—	—	—	—	—
Philippines (1953)	240,982	182,032	170,553	(not indicated)	(not indicated)		62,379	655,947	0.96 or US$ 0.48	
Portuguese India (1952)	10,974	2,804	16,527	500	700	3,000	34,525	1/3/6 or US$ 0.26	0/2/5	0/0/10
Sarawak **	—	—	—	—	—	—	—	—	—	—
Thailand (1953)	389,984	1,470,189	2,095,943	97,657	346,832	107,039	4,507,646	1.51 or US$ 0.08	1.42	—
Viet Nam (1952)	4,245,940 (includes labour)		2,326,850	4,800,000	800,000	300,000	12,472,000	4.15	3.15	?

Equivalent of US$1.00 in local currency

Afghanistan : 21 Afghanis
Burma : 4.762 kyats
Ceylon : 4.772 rupees
China : NT$ 16.00
India : 4.762 rupees
Indonesia : 11.4 rupiahs
Malaya : Malayan $3.03
Netherlands New Guinea : 3.8 guilders
Philippines : 2 pesos
Portuguese India : 4.762 rupees
Thailand : 22 bahts
Sarawak : Malayan $3.03
Viet Nam : 35 piastres

*** Figures are in local currency, unless otherwise indicated.** **** No data available.**

RESIDUAL-SPRAYING DATA

Country and year	Area of operations	Number of sprayed structures	Population directly protected	Superficial area covered per spraying	Technical DDT used	Dosage used	Total man-hours (m-h) or man-days (m-d) per spraying	Total man-hours (m-h) or man-days (m-d) of dis-infestors	Superficial area per inhabitant directly protected	Superficial area treated per man-hour(m-h) or man-day (m-d)	Superficial area treated per man-hour(m-h) or man-day (m-d) of dis-infestor	Average number of persons per structure
Afghanistan . . . . (1952)	3,400 km²	47,483	425,000	20,608,395 m²	61,336 lbs	1.4 g/m²	1,098,000 m-h	62,744 m-h	48.5 m²	178.5 m²/ m-h	312.5 m²/ m-h	8.9
Burma . . . . . (1953 Lashio)	2,500 sq. miles	24,000	105,657	3,458,311 m²	7,316 kg	200 mg/ sq. foot	19,948 m-h	9,780 m-h	32.7 m²	173.5 m²/ m-h	353.6 m²/ m-h	5.2
Ceylon . . . . . (1952)	18,000 sq. miles	496,060	3,100,000	1,280,000,000 sq. feet	301 long tons	60 mg/sq. foot	—	22,680 m-d	413 sq. feet	56,000 sq. feet/m-d ?	—	6.2
China . . . . . (1952)	627.6 sq. miles	21,682	156,217	6,617,660 m²	13,039 kg	1.86 g/m²	42,442 m-h	23,904 m-h	42.2 m²	155.6 m²/ m-h	276 m²/ m-h	7.2
India . . . . . (1952-3 Delhi State)	500 sq. miles	66,000	400,000	66,000,000 sq feet	6 tons	50 mg/sq. foot	4,320 m-d	3,168 m-d	165 sq. feet	15,277 sq. feet/m-d	20,833 sq. feet/m-d	6.0
Indonesia . . . . . (1952)	?	276,640	1,260,052	35,277,926 m ²	68,502 kg	1.9 g/m²	?	?	27.9 m²	?	?	4.5
Malaya . . . . . (1952 pilot project)	7 sq. miles	1,148	4,200	1,450,000 sq. feet	411 kg	200 mg/ sq. foot	2,192 m-h	1,880 m-h	346 sq. feet	660 sq. feet/m-h	770 sq. feet/m-h	3.6
Philippines . . . . . (1953)	?	148,000	677,000	?	171,000	200 mg/ sq. foot	?	?	?	?	?	4.5
Portuguese . . . . . India (1953)	558 km²	5,902	33,500	590,600 m²	844 kg	50-150mg/ sq. foot	630 m-d	449 m-d	varies 7-100 m²	953 m²/ m-d	1,315 m²/ m-d	5.6
Thailand (1953) . . .	87,059 km²	587,002	2,968,336	51,274,318 m²	123,421 kg	240 mg/ sq. foot	99,660 m-d	54,940 m-d	17.27 m²	514.4 m²/ m-d	933 m²/ m-d	4.2
Viet Nam (1952) . . .	?	581,714	3,000,000	?	?	2 g/m²	12,301 m-h	9,695 m-h	4 m² (?)	945 m²	1,200 m²	5.1

RÉSUMÉ

L'auteur résume les renseignements donnés par les gouvernements de 13 pays et territoires — Afghanistan, Birmanie, Ceylan, Chine, Inde, Indonésie, Malaisie, Nouvelle Guinée Hollandaise, Philippines, Inde Portugaise, Sarawak, Thaïlande et Viet-Nam — au sujet des programmes de lutte antipaludique dont l'exécution est en cours ou projetée. Ces informations constituent les réponses à un questionnaire préparé par l'OMS pour servir de base de discussion lors de la Première Conférence asienne du Paludisme, réunie à Bangkok en septembre 1953.

Dans les derniers mois de 1953, quelque 46,5 millions de personnes, sur les 271 millions qui vivent dans les régions impaludées, étaient protégées contre le paludisme. Il ressort également de cette enquête que les pulvérisations d'insecticides à action rémanente — qui constituent la principale méthode de lutte dans ces campagnes — ont réduit de façon significative les indices spléniques et parasitaires. L'opposition que les campagnes ont rencontrée au début, dans certaines régions, a cédé en général devant l'évidence du succès. A la suite de la lutte antipaludique les conditions générales de la santé publique et le développement socio-économique se sont améliorés. Aucune des réponses des gouvernements ne mentionne une résistance des anophèles aux insecticides. Dix gouvernements soulignent la nécessité d'insister auprès des fonctionnaires de santé publique pour les persuader de l'urgence de la lutte antipaludique. La plupart des gouvernements se familiarisent désormais avec l'idée de prendre des dispositions financières à long terme en faveur des programmes de lutte antipaludique.

Cet article donne, pour chacun des pays envisagés, les indications suivantes : les principaux types de construction des habitations et les obstacles que certains matériaux présentent à l'action rémanente des insecticides ; les objections opposées par la population de certaines régions aux programmes antipaludiques ; la saison de transmission et les espèces vectrices ; l'évaluation des résultats des campagnes ; la façon dont les campagnes sont organisées et les autorités qui en assument la responsabilité ; les projets pour les années qui viennent et le mode de financement.