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STATUS OF MALARIA ERADICATION IN THE AMERICAS

XIX REPORT

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REPORT ON THE STATUS OF MALARIA ERADICATION IN THE AMERICAS

XIX REPORT

Introduction

The Director of the Pan American Sanitary Bureau has the honor to submit to the XX Meeting of the Directing Council the XIX Report on the Status of Malaria Eradication in the Americas.

The progress made by this program, which was launched under a resolution adopted by the XIV Pan American Sanitary Conference in 1954, has varied from country to country.

In view of the delay in achieving the objective of malaria eradication, the Twenty-Second World Health Assembly adopted a resolution recommending a review of the program with a view to adapting the strategy to the local epidemiological situation and the administrative and financial resources of each country.

In compliance with that resolution, eight countries undertook a review of their programs in 1970, they were Costa Rica, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, and Panama. The results of the review are discussed in the chapter dealing with individual countries.

The Status of malaria eradication in the Americas is divided in four chapters. The first contains information on the general status of the program and country by country summaries of progress. The second describes special technical problems that have arisen, and the measures being applied in the various programs to combat them. The third summarizes current research aimed at finding new attack methods or improving existing methods. The fourth deals with assistance provided by international agencies or under bilateral agreements.

The data presented are taken from replies to an annual questionnaire received from the countries, and from the periodical statistical reports submitted to the Pan American Sanitary Bureau by the programs. This information has been supplemented by data from technical reports on research projects and data obtained in the countries by Headquarters' staff.

I. STATUS OF MALARIA ERADICATION PROGRAMS

A. General situation

Of the 47 political units in the Americas, 34 have originally malarious areas; 12 have achieved eradication, the entire territory of one country is in the consolidation phase, and the remaining 21 are applying attack measures in all or part of their originally malarious area.

The United States of America, Puerto Rico and the US Virgin Islands requested the inclusion of their originally malarious areas in the Register of areas in which malaria has been eradicated. A pertinent report was prepared for consideration by the WHO Expert Committee on Malaria, which met in Geneva from 19 to 30 October 1970. In its Fifteenth Report, the Committee stated:

"On basis of the evidence presented, the Committee believes that:

- a) In spite of many imported cases, the active foci that occurred after 1957 were few and small (with a maximum of four cases in each focus), no active focus has ever developed beyond the first degree, and they have all been eliminated with the required speed and efficiency;
- b) The vigilance applied is of the highest standard; health services provide ample diagnostic and other facilities, and are able to carry out therapeutic and other preventive measures as needed;

- c) There are legal provisions for action against the establishment of the disease;
- d) The population makes ample use of the excellent facilities offered by the health service; and
- e) Taking into account also the low receptivity of the areas, there is every probability that eradication can be maintained."

The Committee therefore decided to recommend to the Director General of WHO, the inclusion of the United States of America and its outlying areas of Puerto Rico and the Virgin Islands (USA) in the WHO official register of areas where malaria has been eradicated.

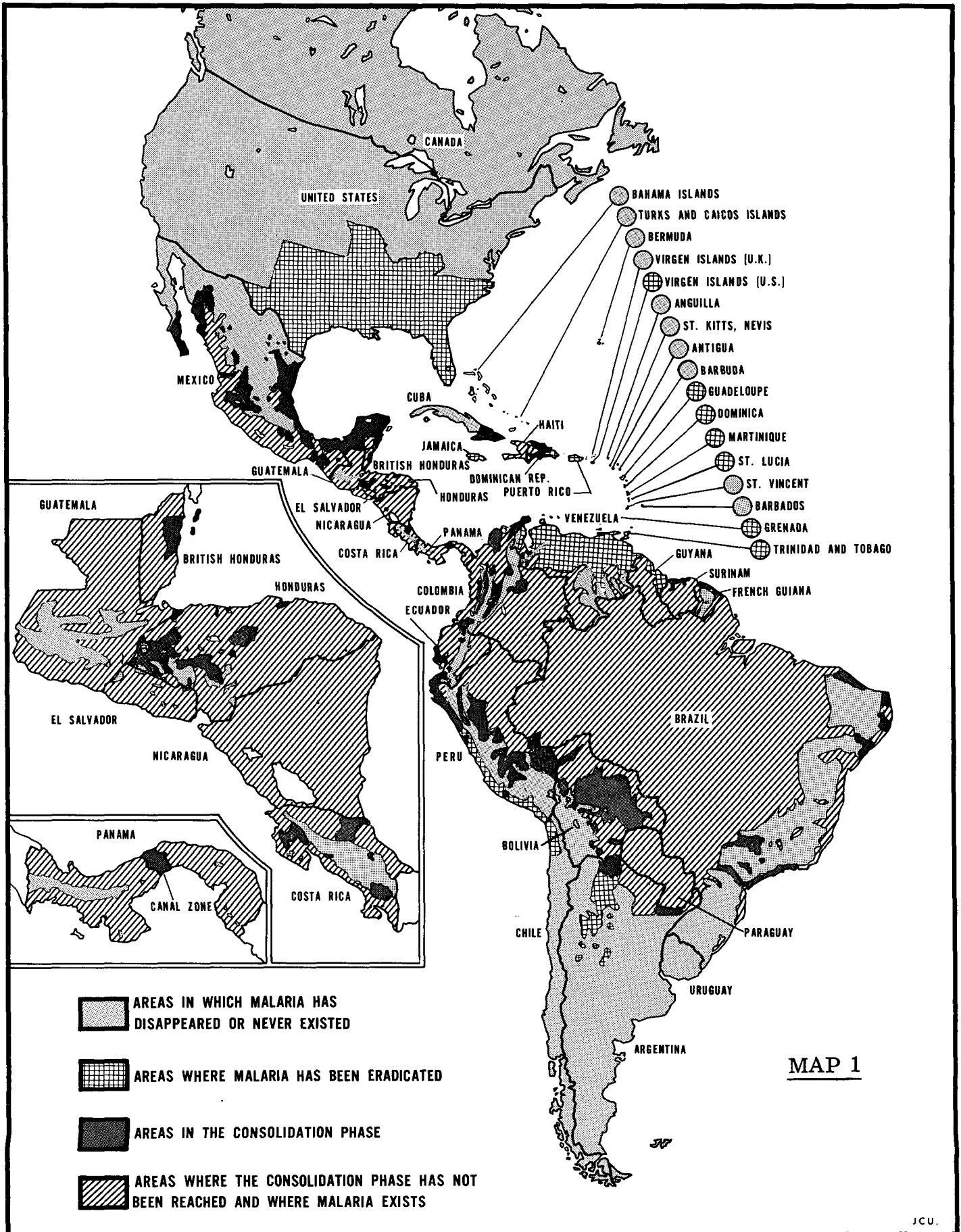
Thus there are now nine political units in the Americas with areas included in the WHO Register of areas where malaria has been eradicated. In addition, this register includes nine political units from other regions of the world.

The estimated population of the Americas at 31 December 1970, was 505,819,000, of which 181,257,000 (35.8%) were living in originally malarious areas. Of the last-mentioned figure, 121,288,000 (66.9%) were living in areas which were in the consolidation and maintenance phases; 59,807,000 were living in areas in the attack phase (33.0%) and 162,000 in areas in which the program had not been initiated (0.1%). Table No. 9 shows the breakdown of the population by country and by program phase.

The population of areas in the maintenance phase increased from 41.3 per cent in 1969 to 44.6 per cent in 1970, the originally malarious area of Cuba, and some areas of Peru, the Dominican Republic and Surinam having been into this phase during the year. To sum up, the population of the areas in the maintenance phase increased by 8,013,000.

The population of the area in the consolidation phase (40,518,000 inhabitants) represents 22.3 per cent of the population of the originally malarious area. Four countries—Argentina, Brazil, Costa Rica, and Guyana—increased their areas in that phase containing 2,449,000 inhabitants, but the total population involved declined as compared with 1969, due to the fact that 6,734,000 inhabitants were living in areas in the maintenance phase and 2,591,000 inhabitants were living in areas that were put back into the attack phase (Mexico).

Maps Nos. 1 and 2 show the geographical distribution of the areas by program phase in 1969 and 1970, and Table No. 1 shows the evolution of malaria eradication programs in the Americas by phase and by year since the beginning of the coordinated campaign.



STATUS OF THE MALARIA ERADICATION PROGRAM IN THE AMERICAS, 31 DECEMBER 1969

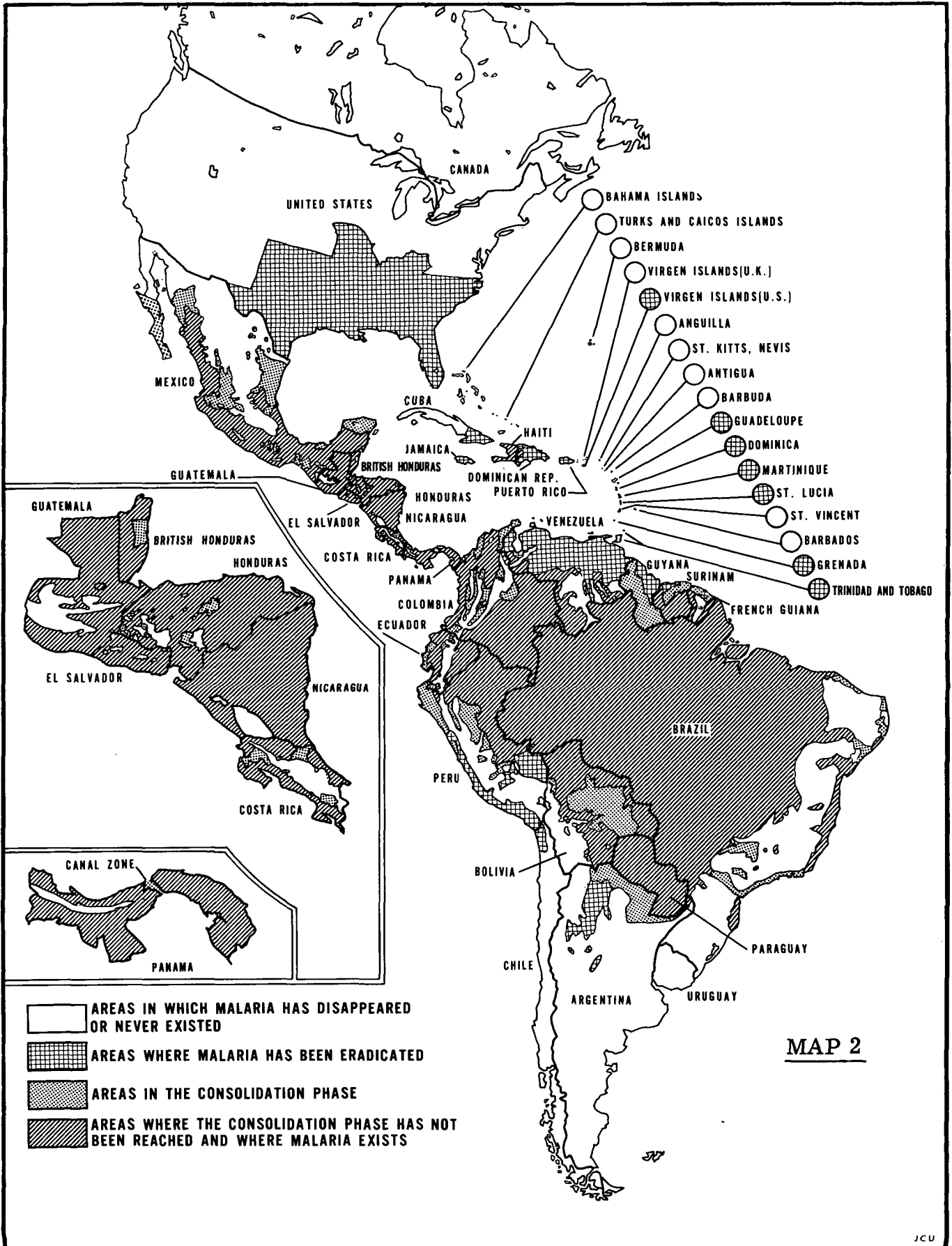


Table 1

EVOLUTION OF MALARIA ERADICATION IN THE
AMERICAS, BY PHASE 1958-1970

(Population in thousands)

Year	Originally malarious areas					Total population
	Maint. phase	Consolid. phase	Attack phase	Prep. phase or program not yet started	Total	
1958	52 866	1 996	46 196	34 351	135 409	386 276
1959	52 856	9 349	56 292	27 423	145 920	394 606
1960	54 363	10 101	53 400	25 722	143 586	400 500
1961	56 979	17 879	39 021	33 413	147 292	416 008
1962	59 299	30 424	49 276	14 743	153 742	427 919
1963	56 546	33 901	31 910	29 664	152 021	434 950
1964	57 414	32 277	34 426	34 525	158 642	447 666
1965	60 975	34 731	38 575	12 108	146 389	455 527
1966	69 760	36 128	43 369	17 212	166 469	463 649
1967	70 720	41 581	44 766	12 834	169 901	474 868
1968	72 441	45 812	56 234	217	174 704	484 664
1969	72 757	46 987	56 375	206	176 325	491 483
1970	80 770	40 518	59 807	162	181 257	505 819

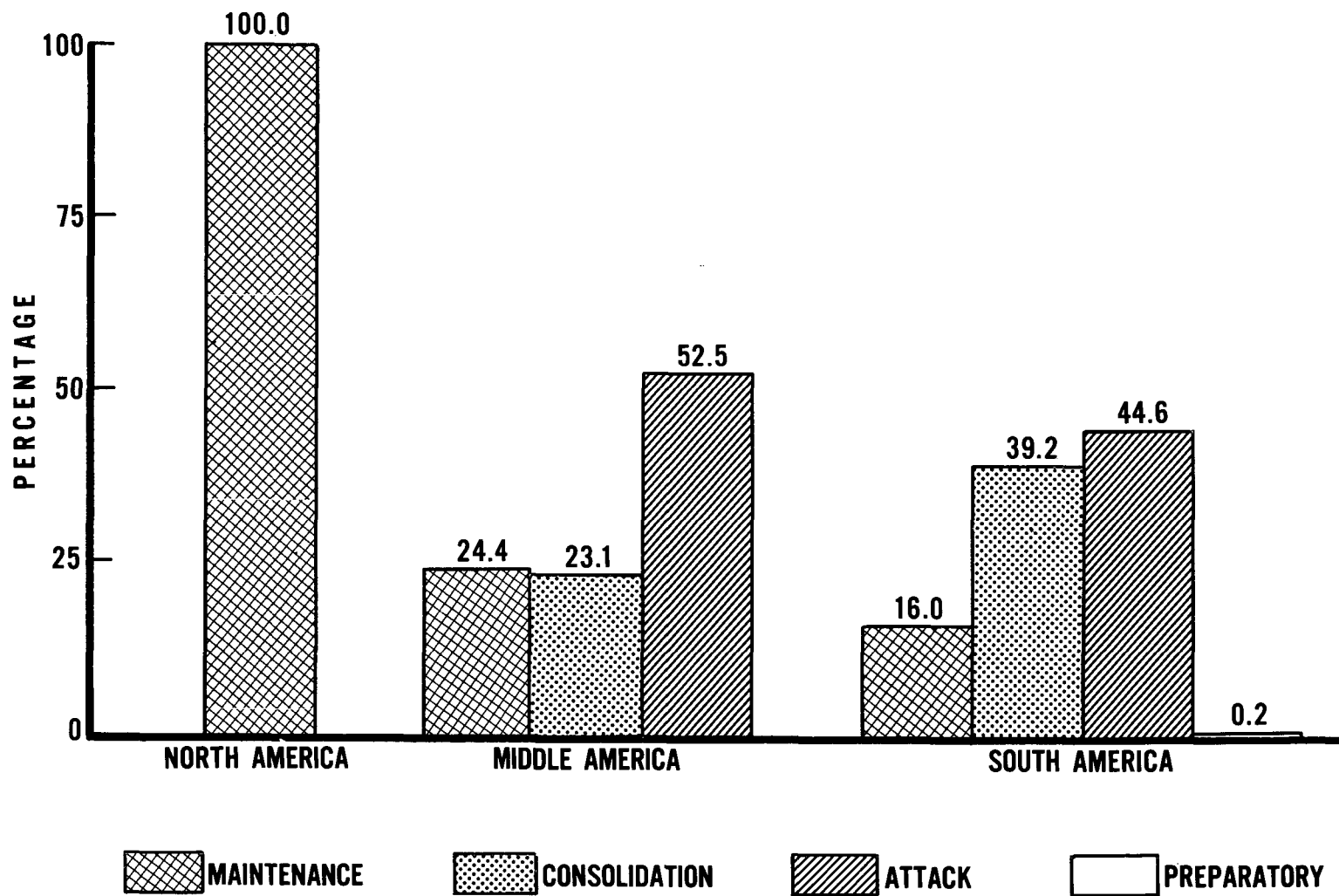
The population living in areas in the consolidation and maintenance phase increased by 1, 544, 000 inhabitants.

Considering the Hemisphere by geographical regions (Graph No.1), the whole of North, America is in the maintenance phase. In Middle America, (Mexico, Central America, Panama and the Caribbean Islands) 47.5 per cent of the population in the originally malarious area are in the consolidation and maintenance phase, and in South America, 55.2 per cent.

During the year under consideration, clear progress has been made in Cuba which moved into the maintenance phase, in Guyana which moved into the consolidation phase and in the Dominican Republic, Peru, Surinam, Brazil, Argentina, and Costa Rica which extended their areas in the maintenance or consolidation phase. Although there were no changes with respect to phases of the program in areas in Ecuador, Panama, Paraguay and Colombia, the incidence of malaria declined. In Guatemala, Brazil and French Guiana there was no significant change in incidence, but in Venezuela, El Salvador, Haiti, Bolivia, Honduras and Nicaragua an increase was observed. Mexico shifted back from the consolidation phase into the attack phase an area of 141,682 Km² with 2,591,000 inhabitants, because the resources available in previous years did not permit it to carry out the necessary operations for preventing the reestablishment of endemicity.

Graph 1

STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY REGION, 1970 POPULATION BY PHASE AS A PERCENTAGE OF ORIGINALLY MALARIOUS AREA



B. Current extent of the problem

Table No. 2 gives general information about the number of slides and number of cases detected in the Americas between 1958 and 1970.

Table 2

SUMMARY OF CASE DETECTION IN THE AMERICAS, 1958-1970

Year	Number of slides examined	Number of slides found positive	Per cent positive
1958	1 716 103	56 705	3.3
1959	2 749 117	75 612	2.8
1960	3 955 149	79 998	2.0
1961	5 341 004	99 539	1.9
1962	7 221 367	177 089	2.4
1963	7 903 156	227 026	2.9
1964	8 156 290	254 572	3.1
1965	9 069 950	241 462	2.7
1966	11 731 451	333 245	2.8
1967	11 609 226	369 341	3.2
1968	12 522 696	282 773	2.3
1969	12 179 190	323 782	2.7
1970	9 925 187	344 027	3.5

Table No. 3 summarizes the current status of the eradication campaign in all the countries and territories included in the originally malarious area, the progress achieved, and the prospects for eradicating malaria in the future under existing conditions. Of the 181,257,000 inhabitants of the originally malarious area, it will be seen that at December 1970, 80,770,000 (44.6%) were in the area in which malaria had been achieved; 67,441,000 (37.2%) were in areas in which the prospects for achieving eradication were good; and 37,046,000 (18.2%) were in areas in which satisfactory progress had not been made.

There are still 22 political units with active malaria eradication programs, since they have areas which have not reached the maintenance phase. The population of the originally malarious area of these political units number 115,546,000.

Table 3

TENTATIVE CLASSIFICATION OF THE MALARIA ERADICATION PROGRAMS IN RELATION TO PROSPECT OF ERADICATION AND COUNTRIES OR TERRITORIES WHERE ERADICATION HAS ALREADY BEEN ACHIEVED, 1970

(Population in thousands)

Country or other political unit	Eradication achieved	Good prospect of eradication			Not making satisfactory progress		
		Early eradication quite sure	Early eradication, if current progress continues	Some administrative and/or operational problems, but making progress	Progress dependent upon receiving funds	Serious administrative and/or operational problems	Progress dependent upon funds and new attack measures to solve technical problems
Argentina	1 585	1 183	75	-	-	-	-
Bolivia	-	-	-	-	1 389	411	-
Brazil	830	13 780	14 613	-	-	7 791	-
Chile	165	-	-	-	-	-	-
Colombia	-	7 176	1 206	3 020	-	-	-
Costa Rica	-	100	450	-	-	577	439
Cuba	3 009	-	-	-	-	-	-
Dominican Republic	3 593	280	110	-	-	-	-
Ecuador	-	-	-	1 286	1 976	-	-
El Salvador	-	-	-	-	2 564	-	500
Guatemala	-	-	700	1 192	-	-	471
Guyana	671	43	-	-	-	-	-
Haiti	-	-	-	-	3 588	-	-
Honduras	-	423	219	-	1 354	-	200
Jamaica	1 861	-	-	-	-	-	-
Mexico	-	300	-	14 200	-	5 317	4 100
Nicaragua	-	-	500	-	803	-	685
Panama	-	-	1 405	-	-	-	-
Paraguay	-	-	1 959	-	-	-	-
Peru	1 299	2 283	-	722	-	433	-
Trinidad and Tobago	998	-	-	-	-	-	-
United States	56 370	-	-	-	-	-	-
Venezuela	6 876	-	-	-	-	-	411
British Honduras	-	50	70	-	-	-	-
Canal Zone	-	51	-	-	-	-	-
Dominica	18	-	-	-	-	-	-
French Guiana	27	-	15	3	-	-	-
Grenada	36	-	-	-	-	-	-
Guadeloupe	293	-	-	-	-	-	-
Martinique	207	-	-	-	-	-	-
Puerto Rico	2 600	-	-	-	-	-	-
St. Lucia	96	-	-	-	-	-	-
Surinam	178	27	-	-	-	-	-
Virgin Islands (U. S.)	58	-	-	-	-	37	-
Total	80 770	25 696	21 322	20 423	11 674	14 566	6 806
%	44.6	14.2	11.7	11.3	6.4	8.0	3.8

Taking as a basis Annex 13 of the Report presented by the Director General of the World Health Organization to the Twenty-Second World Health Assembly, entitled "Re-examination of the Global Strategy of Malaria Eradication," as well as the results of the review of the strategy in the countries visited for that purpose in 1970, the population of the malarious area of the countries with active programs is as follows:

Table 4

DISTRIBUTION OF THE POPULATION OF THE MALARIOUS AREA OF THE COUNTRIES WITH ACTIVE PROGRAMS AT DECEMBER 1970, IN RELATION TO THE PROSPECTS OF THE PROGRAM

Category	Population (in thousands)	
	Total	%
Eradication achieved in part of the country or territory	15 059	13.0
Early eradication quite sure	25 696	22.2
Early eradication if current progress continues	21 322	18.5
Operational or administrative problems but progress being made	20 423	17.7
Progress dependent upon receiving funds	11 674	10.0
Serious administrative and operational problems	14 566	12.6
Progress dependent upon financial support and new attack measures to solve serious technical problems	6 806	6.0
Total	115 546	100.0

Table No. 5 shows the number and distribution of slides examined and the number of positive slides found in each country by program phase.

The area in the maintenance phase is distributed over 20 political units and contains 80,770,000 inhabitants. Among 1,255,690 slides examined 7,346 cases of malaria were detected, of which 57.8 per cent were in the United States of America, 37.5 per cent in Venezuela and 3.2 per cent in Peru. There was a total of 800 autochthonous cases, 633 being in Venezuela (79.2%), 164 in Peru (20.0%), and 6 in French Guiana (0.8%). The number, species, and classification of the cases is shown in Table No. 6.

The area in the consolidation phase is distributed over 15 political units and has a population of 40,518,000 inhabitants or 22.3 per cent of the total population of the originally malarious area of the Hemisphere. During the year 2,235,183 blood slides were examined, the annual blood examination rate (ABER) being 5.5 per cent; 15,868 cases of malaria were detected, the positivity rate being 0.7 per cent and the annual parasite incidence (API) 0.30 per 1,000 inhabitants. If only cases resulting from local transmission are taken into account, that is to say 2,507 cases classified as autochthonous, 80 classified as introduced, and 3,332 cases which are believed to have occurred among non-investigated cases, or 5,919 in all the annual parasite incidence (local) would be 0.15 per 1,000 inhabitants of the area.

Of the 15 units with areas in the consolidation phase, four countries-Colombia (4,885 cases); Ecuador (4,299); Mexico (3,723) and Bolivia (1,259)-were responsible as a whole for 14,166 cases or 89.3 per cent of the total, while the population resident in areas in the consolidation phase of these four countries amounts to 55 per cent of the total population of the areas in the consolidation phase in the Hemisphere. Table No. 7 shows the origin of cases as well as the species of parasite involved.

In areas in the attack phase, 6,141,205 blood slides were examined and 316,802 cases of malaria detected the slide positivity rate being 5.1 per cent. The annual blood examination rate was 10.3% of the population of the area (59,807,000 inhabitants) and the annual parasite incidence (API) was 5.3 per 1,000 inhabitants.

In the non-malarious areas 293,109 blood slides were examined and 4,011 found positive. From the practical standpoint and for the purpose of classifying statistical information, the infections are assumed to have been contracted in the malarious area in the attack phase when epidemiological investigation does not indicate another origin.

The results of epidemiological evaluation in areas in the attack phase and of surveillance in areas in the consolidation and maintenance phase are shown in Tables Number 4 to 8. The following summary gives an overall picture of the distribution of infections by species of parasite;

Phase	Total	<u>P. falciparum</u>		<u>P. vivax</u>		<u>P. malariae</u>	
		No.	%	No.	%	No.	%
Maintenance phase	7 145	751	10.5	6 350	88.9	44	0.6
Consolidation phase	15 868	2 993	18.9	12 867	81.1	8	0.05
Attack phase and non-malarious area	320 813	82 331	25.7	238 162	74.2	314	0.1

In addition to the species mentioned in the maintenance phase, during 1970 there diagnosed in the United States, four cases of P. ovale 113 mixed infections, and in 84 cases the species involved was not identified.

Tables 9 and 10 show the status of the program in each country by population and geographical area by phase. Graph No 2. shows the distribution of the population in the originally malarious areas by program phase. The statistical data on the activities of the program of each country are shown in the tables on pages 40 to 124.

The status of each program is summarized below and it supplements the numerical data given in the corresponding tables.

Table 5

CASE DETECTION BY COUNTRY AND PHASE OF PROGRAM, 1970

Country or other political unit	Total		Maintenance phase		Consolidation phase		Attack phase		Non-malarious areas	
	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases	Slides examined	Positive cases
Argentina	95 410	86	40 225	7	47 206	70	7 846	9	133	-
Bolivia	167 265	6 862	-	-	32 003	1 259	135 019	5 532	243	71
Brazil	2 030 459	54 644	21 287	8	709 526	560	1 269 080	52 452	30 566	1 624
Colombia	685 412	32 272	-	-	375 073	4 885	305 498	27 004	4 841	383
Costa Rica	195 484	350	-	-	33 637	26	161 665	290	182	34
Cuba	584 084	1	375 661	1	-	-	-	-	208 423	-
Dominican Republic	628 221	161	456 957	2	69 988	-	101 224	159	52	-
Ecuador	360 879	28 375	-	-	142 216	4 299	218 663	24 076	-	-
El Salvador	572 373	45 436	-	-	-	-	553 965	44 960	18 408	476
Guatemala	447 706	11 044	-	-	-	-	445 128	10 841	2 578	203
Guyana	63 623	18	17 637	1	45 986	17	-	-	-	-
Haiti	357 366	10 658	-	-	-	-	357 366	10 658	-	-
Honduras	357 436	34 537	-	-	35 673	611	320 019	33 837	1 744	89
Jamaica	39 817	2	39 817	2	-	-	-	-	-	-
Mexico	1 889 877	61 158	-	-	567 249	3 723	1 303 426	56 964	19 202	471
Nicaragua	281 386	27 260	-	-	-	-	281 386	27 260	-	-
Panama	237 477	4 584	-	-	-	-	237 477	4 584	-	-
Paraguay	157 587	1 429	-	-	-	-	156 486	1 421	1 101	8
Peru	310 237	4 494	33 681	234	112 392	253	164 164	4 007	-	-
Trinidad and Tobago	25 301	1	25 301	1	-	-	-	-	-	-
United States ^{a)}	1 531 ^{a)}	4 245	1 531	4 245	-	-	-	-	-	-
Venezuela	271 474	15 145	180 710	2 753	-	-	88 424	11 789	2 340	603
British Honduras	15 522	33	-	-	2 825	5	12 697	28	-	-
Canal Zone	35 462	57	-	-	35 462	57	-	-	-	-
Dominica .....	...	...	...	...	...	...	...	...	...	...
French Guiana	8 237	117	7 043	53	137	19	1 057	45	-	-
Grenada	644	-	644	-	-	-	-	-	-	-
Guadeloupe	56 215	-	55 196	-	-	-	-	-	1 019	-
Puerto Rico .....	...	39	...	39	-	-	-	-	-	-
St. Lucia .....	...	...	...	...	...	...	...	...	...	...
Surinam	48 702	1 019	-	-	25 810	84	20 615	886	2 277	49
Total	9 925 187	344 027	1 255 690	7 346	2 235 183	15 868	6 141 205	316 802	293 109	4 011

a) Includes only the slides examined at CDC.

Table 6
EPIDEMIOLOGICAL EVALUATION IN AREAS UNDER MAINTENANCE PHASE IN MALARIA
ERADICATION PROGRAMS, 1970

Country or other political unit	Number of slides examined	Total No. of positive cases	Species of parasite			Origin of infections						
			<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	Autochthonous	Relapsing	Imported		Induced	Introduced	Unclassified or not investigated
								from abroad	from areas within country			
Argentina	40 225	7	-	7	-	-	-	1	2	-	2	2
Brazil	21 287	8	4	4	-	-	-	-	8	-	-	-
Cuba	584 084 ^{a)}	1	1	-	-	-	-	1	-	-	-	-
Dominican Republic ...	456 957	2	2	-	-	1	-	1	-	-	-	-
Guyana	17 637	1	-	1	-	-	-	-	-	-	-	1
Jamaica	39 817	2	2	-	-	-	-	2	-	-	-	-
Peru	33 681	234	1	230	3	160	-	-	2	-	-	72
Trinidad and Tobago...	25 301	1	-	-	1	-	1	-	-	-	-	-
United States of America	1 531 ^{b)}	4 245 ^{c)}	519	3 488	37	-	248	3 981	-	14	2	-
Venezuela	180 710	2 753	170	2 580	3	633	12	264	1 542	4	297	1
Dominica .....	...	...	...	...	...	...	...	...	...	...	...	...
French Guiana	7 043	53	50	3	-	6	1	5	-	-	36	5
Grenada and Carriacou	644	-	-	-	-	-	-	-	-	-	-	-
Guadeloupe	56 215	-	-	-	-	-	-	-	-	-	-	-
Puerto Rico .....	...	39	2	37	-	-	-	39	-	-	-	-
St. Lucia .....	...	...	...	...	...	...	...	...	...	...	...	...
Total	1 465 132	7 346	751	6 350	44	800	262	4 294	1 554	18	337	81

... No information.

a) Includes slides taken in non-malarious areas. b) Slides examined at CDC. c) Includes 4 cases P. ovale, 113 mixed infections and 84 without species diagnosed.

Table 7

EPIDEMIOLOGICAL EVALUATION IN AREAS IN CONSOLIDATION PHASE IN MALARIA
ERADICATION PROGRAMS, 1970

Country or other political unit	Population (thousands)	No. of slides examined	Total No. of positive cases	API Total (a)	API Local (b)	Species of parasite			Origin of infections						
						<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	Autochthonous	Relapsing	Imported		Induced	Introduced	Unclassified or not investigated
											from abroad	from areas within country			
Argentina	1 183	47 206	70	0.06	0.04	-	70	-	33	3	13	1	-	2	18
Bolivia	1 389	32 003	1 259	0.9	0.8	5	1 254	-	265	1	4	25	-	-	964
Brazil	13 780	709 526	560	0.04	0	218	341	1	58	7	-	363	3	4	125
Colombia	8 382	375 073	4 885	0.6	0.08	2 295	2 590	-	478	9	70	2 921	5	4	1 398
Costa Rica	100	33 637	26	0.3	0.2	1	25	-	21	-	1	1	2	-	1
Dominican Republic	280	69 988	-	-	-	-	-	-	-	-	-	-	-	-	-
Ecuador	1 286	142 216	4 299	3.3	0.8	257	4 042	-	318	75	3	948	-	52	2 903
Guyana	43	45 986	17	0.4	0	9	8	-	-	-	15	-	-	-	2
Honduras	423	35 673	611	1.4	0.7	71	540	-	181	23	-	147	-	-	260
Mexico	11 226	567 249	3 723	0.3	0.2	8	3 709	6	966	207	1	316	7	4	2 222
Peru	2 283	112 392	253	0.1	0.1	-	252	1	155	9	-	73	-	3	13
British Honduras	50	2 825	5	0.1	0.1	-	5	-	3	1	-	-	-	-	1
Canal Zone	51	35 462	57	1.1	0.3	35	22	-	16	2	39	-	-	-	-
French Guiana	15	137	19	1.3	0.5	10	9	-	8	-	11	-	-	-	-
Surinam	27	25 810	84	3.1	0.6	84	-	-	5	-	-	22	-	-	57
Total	40 518	2 235 183	15 868	0.4	0.15	2 993	12 867	8	2 507	337	157	4 817	17	69	7 964

a) Estimated on the total number of cases found in the area, by 1 000 inhabitants. b) Estimated on the classified autochthonous, introduced, and estimated number of autochthonous among the non-investigated cases, by 1 000 inhabitants.

Table 8

EPIDEMIOLOGICAL EVALUATION OPERATIONS IN ATTACK PHASE AND
NON-MALARIOUS AREAS, 1970a)

Country or other political unit	Slides examined		Species found			
	Total	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
Argentina	7 979	9	0.1	-	9	-
Bolivia	135 262	5 603	4.1	646	4 957	-
Brazil	1 299 646	54 076	4.2	28 335	25 590	151
Colombia	310 339	27 387	8.8	15 680	11 690	17
Costa Rica	161 847	324	0.2	4	319	1
Dominican Republic	101 276	159	0.2	159	-	-
Ecuador	218 663	24 076	11.0	2 571	21 497	8
El Salvador	572 373	45 436	7.9	4 202	41 234	-
Guatemala	447 706	11 044	2.5	81	10 963	-
Haiti	357 366	10 658	3.0	10 654	-	4
Honduras	321 763	33 926	10.5	5 534	28 392	-
Mexico	1 322 628	57 435	4.3	3 018	54 374	43
Nicaragua.....	281 386	27 260	9.7	5 180	22 080	-
Panama	237 477	4 584	2.0	3 402	1 182	-
Paraguay	157 587	1 429	0.9	155	1 274	-
Peru	164 164	4 007	2.4	138	3 795	74
Venezuela	90 764	12 392	13.7	1 606	10 770	16
British Honduras	12 697	28	0.2	-	28	-
French Guiana.....	1 057	45	4.3	41	4	-
Surinam	22 892	935	4.1	925	10	-
Total	6 224 872	320 813	5.2	82 331	238 168	314

a) Slides examined in Cuba and Guadeloupe from their non-malarious areas are not included in this table, as the two countries do not have area in attack phase. They are included in Table 6.

Table 9

STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY POPULATION, 1970

(Population in thousands)

Country or other political unit	Total population	Population of originally malarious areas									
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase		Prep. phase or program not yet started	
		Total	%	Total	%	Total	%	Total	%	Total	%
Argentina	23 413	2 843	12.1	1 585	55.8	1 183	41.6	75	2.6	-	-
Barbados	253 ^{a)}	-	-	-	-	-	-	-	-	-	-
Bolivia	4 943	1 800	36.4	-	-	1 389	77.2	411	22.8	-	-
Brazil	93 870	37 014	39.4	830	2.2	13 780	37.2	22 404	60.5	-	-
Canada	21 089 ^{a)}	-	-	-	-	-	-	-	-	-	-
Chile	9 566 ^{a)}	165	1.7	165	100.0	-	-	-	-	-	-
Colombia	21 780	12 418	57.0	-	-	8 382	67.5	3 874	31.2	162	1.3
Costa Rica	1 767	550	31.1	-	-	100	18.2	450	81.8	-	-
Cuba	8 553	3 009	35.2	3 009	100.0	-	-	-	-	-	-
Dominican Republic	4 011	3 983	99.3	3 593	90.2	280	7.0	110	2.8	-	-
Ecuador	5 888	3 262	55.4	-	-	1 286	39.4	1 976	60.6	-	-
El Salvador	3 512	3 064	87.2	-	-	-	-	3 064	100.0	-	-
Guatemala	5 170	2 363	45.7	-	-	-	-	2 363	100.0	-	-
Guyana	714	714	100.0	671	94.0	43	6.0	-	-	-	-
Haiti	4 867	3 588	73.7	-	-	-	-	3 588	100.0	-	-
Honduras	2 514	2 196	87.4	-	-	423	19.3	1 773	80.7	-	-
Jamaica	2 233	1 861	83.3	1 861 ^{b)}	100.0	-	-	-	-	-	-
Mexico	48 314	23 917	49.5	-	-	11 226	46.9	12 691	53.1	-	-
Nicaragua	1 988	1 988	100.0	-	-	-	-	1 988	100.0	-	-
Panama	1 464	1 405	96.0	-	-	-	-	1 405	100.0	-	-
Paraguay	2 396	1 959	81.8	-	-	-	-	1 959	100.0	-	-
Peru	13 587	4 737	34.9	1 299 ^{b)}	27.4	2 283	48.2	1 155	24.4	-	-
Trinidad and Tobago	1 158	998	86.2	998 ^{b)}	100.0	-	-	-	-	-	-
United States of America	205 056	56 370	27.5	56 370 ^{b)}	100.0	-	-	-	-	-	-
Uruguay	2 852 ^{a)}	-	-	-	-	-	-	-	-	-	-
Venezuela	9 793	7 287	74.4	6 876 ^{c)}	94.4	-	-	411	5.6	-	-
Antigua	63 ^{a)}	-	-	-	-	-	-	-	-	-	-
Bahamas	144 ^{a)}	-	-	-	-	-	-	-	-	-	-
Bermuda	51 ^{a)}	-	-	-	-	-	-	-	-	-	-
British Honduras	120	120	100.0	-	-	50	41.7	70	58.3	-	-
Canal Zone	51	51	100.0	-	-	51	100.0	-	-	-	-
Dominica	74 ^{a)}	18 ^{d)}	24.3	18 ^{b)}	100.0	-	-	-	-	-	-
Falkland Islands	2 ^{a)}	-	-	-	-	-	-	-	-	-	-
French Guiana	45	45	100.0	27	60.0	15	33.3	3	6.7	-	-
Grenada and Carriacou	106 ^{d)}	36	34.0	36 ^{b)}	100.0	-	-	-	-	-	-
Guadeloupe	335 ^{d)}	293	87.5	293	100.0	-	-	-	-	-	-
Martinique	333 ^{e)}	207	62.2	207	100.0	-	-	-	-	-	-
Montserrat	15 ^{a)}	-	-	-	-	-	-	-	-	-	-
Netherland Antilles	218 ^{a)}	-	-	-	-	-	-	-	-	-	-
Puerto Rico	2 800	2 600	92.9	2 600 ^{b)}	100.0	-	-	-	-	-	-
St. Kitts, Nevis, Anguilla	56 ^{a)}	-	-	-	-	-	-	-	-	-	-
St. Lucia	112 ^{d)}	96	85.7	96 ^{b)}	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	5 ^{d)}	-	-	-	-	-	-	-	-	-	-
St. Vincent	95 ^{a)}	-	-	-	-	-	-	-	-	-	-
Surinam	376	242	64.4	178	73.6	27	11.2	37	15.3	-	-
Virgin Islands (U. K.)	9 ^{e)}	-	-	-	-	-	-	-	-	-	-
Virgin Islands (U. S.)	58 ^{e)}	58	100.0	58 ^{b)}	100.0	-	-	-	-	-	-
Total	505 819	181 257	35.8	80 770	44.6	40 518	22.3	59 807	33.0	162	0.1

a) United Nations estimates. b) Population in areas where eradication of malaria has been certified by PAHO/WHO.

c) Includes an area with 5 140 197 inhabitants where eradication of malaria has been certified by PAHO/WHO.

d) 1969 figures. e) 1968 figures.

Table 10

STATUS OF MALARIA ERADICATION IN THE AMERICAS, BY AREA, 1970
(Area in Km²)

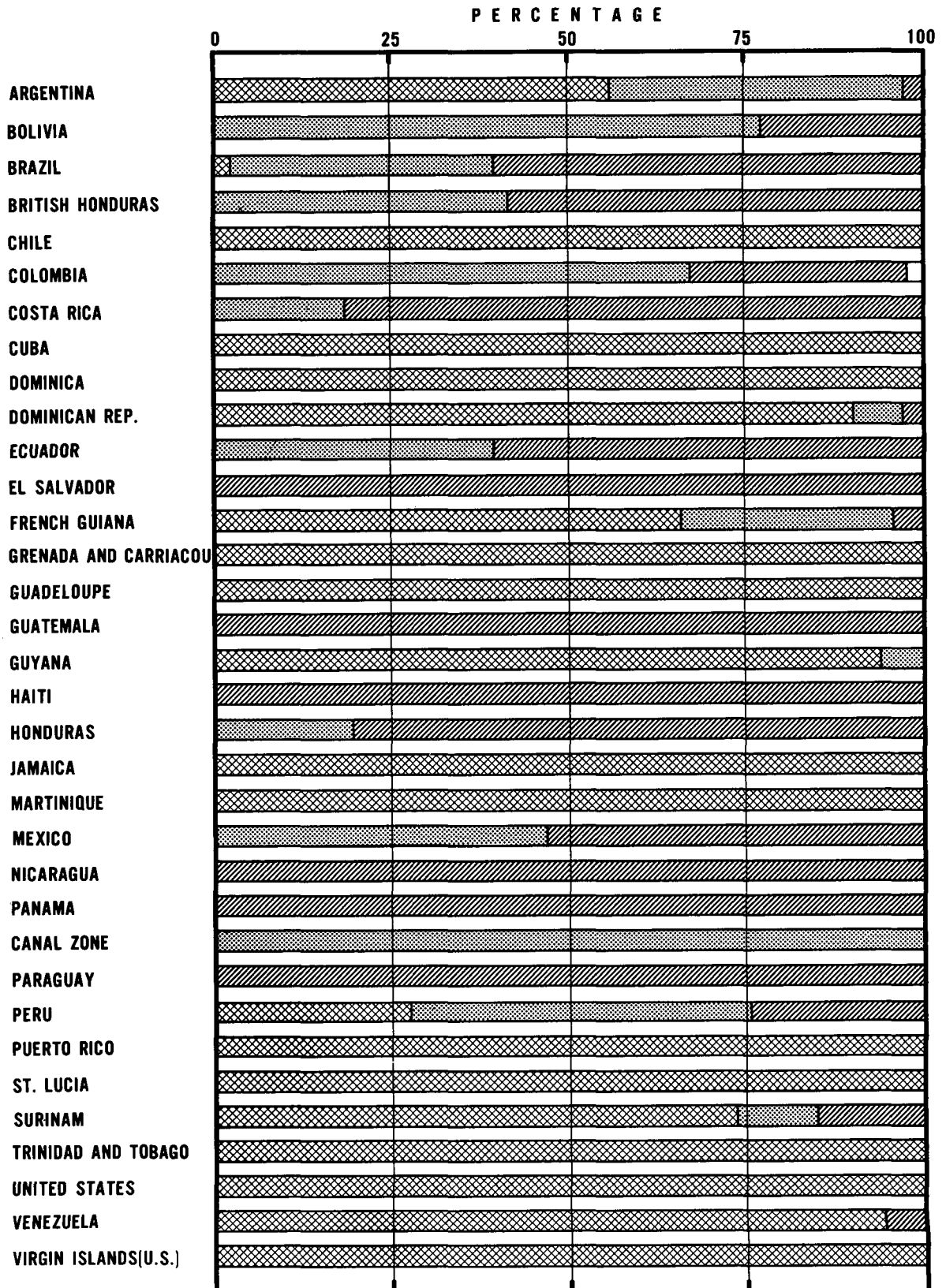
Country or other political unit	Total area	Originally malarious areas									
		Total		Malaria eradication claimed (maintenance phase)		Consolidation phase		Attack phase		Prep. phase or program not yet started	
		Total	%	Total	%	Total	%	Total	%	Total	%
Argentina	4 024 458	349 051	8.7	111 661	32.0	235 690	67.5	1 700	0.5	-	-
Barbados	430	-	-	-	-	-	-	-	-	-	-
Bolivia	1 098 581	821 346	74.8	-	-	698 040	85.0	123 306	15.0	-	-
Brazil	8 511 965	6 885 713	81.0	1 056	0.01	193 530	2.8	6 691 127	97.2	-	-
Canada	9 221 016	-	-	-	-	-	-	-	-	-	-
Chile	741 767	55 287	7.5	55 287	100.0	-	-	-	-	-	-
Colombia	1 138 914	970 849	85.2	-	-	113 176	11.7	835 441	86.1	22 232	2.3
Costa Rica	50 900	35 446	69.6	-	-	8 451	23.8	26 995	76.2	-	-
Cuba	110 422	35 801	32.4	35 801	100.0	-	-	-	-	-	-
Dominican Republic	48 442	47 562	98.2	38 046	80.0	6 235	13.1	3 281	6.9	-	-
Ecuador	291 906	175 462	60.1	-	-	27 797	15.8	147 665	84.2	-	-
El Salvador	21 149	19 452	92.0	-	-	-	-	19 452	100.0	-	-
Guatemala	108 889	80 350	73.8	-	-	-	-	80 350	100.0	-	-
Guyana	215 025	215 025	100.0	39 437	18.3	175 588	81.7	-	-	-	-
Haiti	27 750	19 100	81.7	-	-	-	-	19 100	100.0	-	-
Honduras	112 088	101 351	94.4	-	-	7 123	7.0	94 228	93.0	-	-
Jamaica	11 428	10 028	87.7	10 028 ^a	100.0	-	-	-	-	-	-
Mexico	1 967 183	1 150 000	58.5	-	-	434 085	37.7	715 915	62.3	-	-
Nicaragua	127 358	118 358	92.9	-	-	-	-	118 358	100.0	-	-
Panama	75 650	69 840	92.3	-	-	-	-	69 840	100.0	-	-
Paraguay	406 752	406 552	99.9	-	-	-	-	406 552	100.0	-	-
Peru	1 285 216	961 171	74.8	195 818	20.4	221 930	23.1	543 423	56.5	-	-
Trinidad and Tobago	5 605	5 444	97.1	5 444 ^a	100.0	-	-	-	-	-	-
United States of America	9 359 781	2 309 601	24.7	2 309 601 ^a	100.0	-	-	-	-	-	-
Uruguay	186 926	-	-	-	-	-	-	-	-	-	-
Venezuela	912 050	600 000	65.8	461 259 ^b	76.9	-	-	138 741	23.1	-	-
Antigua	280	-	-	-	-	-	-	-	-	-	-
Bahamas	11 396	-	-	-	-	-	-	-	-	-	-
Bermuda	53	-	-	-	-	-	-	-	-	-	-
British Honduras	22 965	22 965	100.0	-	-	4 307	18.8	18 658	81.2	-	-
Canal Zone	1 432	1 432	100.0	-	-	1 432	100.0	-	-	-	-
Dominica	751	152	20.2	152 ^a	100.0	-	-	-	-	-	-
Falkland Islands	11 961	-	-	-	-	-	-	-	-	-	-
French Guiana	90 000	22 500	25.0	2 000	8.9	7 500	33.3	13 000	57.8	-	-
Grenada and Carriacou	342	103	30.1	103 ^a	100.0	-	-	-	-	-	-
Guadeloupe	1 779	1 136	63.9	1 136	100.0	-	-	-	-	-	-
Martinique	1 080	300	27.8	300	100.0	-	-	-	-	-	-
Montserrat	84	-	-	-	-	-	-	-	-	-	-
Netherland Antilles	961	-	-	-	-	-	-	-	-	-	-
Puerto Rico	8 896	8 896	100.0	8 896 ^a	100.0	-	-	-	-	-	-
St. Kitts, Nevis, Anguilla	396	-	-	-	-	-	-	-	-	-	-
St. Lucia	603	510	84.6	510 ^a	100.0	-	-	-	-	-	-
St. Pierre and Miquelon	240	-	-	-	-	-	-	-	-	-	-
St. Vincent	389	-	-	-	-	-	-	-	-	-	-
Surinam	163 820	163 750	99.9	10 450	6.4	42 950	26.2	110 350	67.4	-	-
Virgin Islands (U. K.)	174	-	-	-	-	-	-	-	-	-	-
Virgin Islands (U. S.)	344	344	100.0	344 ^a	100.0	-	-	-	-	-	-
Total	40 379 597	15 664 877	38.8	3 287 329	21.0	2 177 834	13.9	10 177 482	65.0	22 232	0.1

a) Area where eradication of malaria has been certified by PAHO/WHO.

b) Includes an area of 407 945 Km² where eradication of malaria has been certified by PAHO/WHO.

Graph 2

DISTRIBUTION OF POPULATION IN THE ORIGINALLY MALARIOUS AREAS OF THE AMERICAS BY PHASE OF THE PROGRAM, 1970



MAINTENANCE
 CONSOLIDATION
 ATTACK
 PREPARATORY

ARGENTINA

12.1 per cent of the population of the country lives in the malarious area, situated in the North Eastern part of the country which is the southernmost limit of the extent of the malaria problem in the Americas. The vector is *A. darlingi*, a mosquito which responds well to the attack measures used (DDT). Of the 2,843,000 inhabitants of the originally malarious area, 2,768,000 (97.4 per cent) live in areas which have reached the consolidation or maintenance phase; the problem is limited to a small area still in the attack phase containing 75,000 inhabitants (2.6 per cent).

During the year 95,410 blood slides were examined and 86 cases were detected; seven in areas in the maintenance phase, none of which were autochthonous; 70 in areas in the consolidation phase, all due to *P. vivax*, and of which 33 were classified as autochthonous; and nine in areas in the attack phase.

Most of the cases in the area in the consolidation phase were due to a small epidemic outbreak which occurred in the Province of Salta, against which corrective measures were taken.

A total of 50,000 sprayings were made, of which 35,473 were emergency measures taken in the area in the consolidation phase and the remainder in the area in the attack phase.

The danger of importing cases from neighboring countries has decreased and the prospects of the program achieving its final objective are good.

BOLIVIA

Of the population of the malarious area, 77.2 per cent is in areas in the consolidation phase. The financial difficulties of the program reported in 1969 continued in 1970, with the result that both attack operations and epidemiological surveillance were insufficient. In the first cycle of 1970, a total of 45,310 houses was sprayed but it was necessary to reduce the number to 18,260 in the second cycle. The situation continued to deteriorate with the result that the number of cases detected rose from 4,413 in 1969 to 6,862 in 1970.

With the assistance of PAHO/WHO a mass drug administration program was initiated, covering 16,445 inhabitants in seven areas in the south of the country. Chloroquine, primaquine and pyrimethamine were used in an attempt to obtain a curative effect in three days. This treatment is repeated every sixty days; the program ran from September 1970 to March 1971.

If the program has sufficient funds and they are released on time, substantial progress will be made.

BRAZIL

The program made satisfactory progress in some areas of the country and it was possible to shift 79 municipalities with 1,099,000 inhabitants from the attack phase to the consolidation phase. A further 75 municipalities with a population of 817,365 inhabitants in the area in the attack phase, where no transmission was detected during the year, were placed under observation without spraying operations. At the present time 39.4 per cent of the population of the originally malarious area are in areas in consolidation or maintenance phase.

During 1970, a total of 2,030,459 blood slides was examined and 54,644 malaria cases were found. Compared with the 1969 figure, there was a slight reduction in the number of cases but the slide positivity rate (2.7 per cent) for the whole country remained almost the same.

There were some difficulties in undertaking the activities planned due in part to budget cuts, and in part to the need to postpone some activities while the campaign was being reorganized in accordance with the administrative reforms adopted at the national level.

Towards the end of the year the program was reviewed by a group composed of national experts and advisors of international agencies, which established priority areas for operations, using epidemiological, geographical and socioeconomic criteria. It was agreed that the malarious area should be divided in two parts: a short-term malaria eradication area containing 75 per cent of the population of malarious area of the country, and a long-term eradication area containing 25 per cent of the population.

74 per cent of the population of the long-term eradication area will benefit from regular attack operations and drugs will be supplied as a medical care measure to the remaining 26 per cent; pilot projects will be undertaken to ascertain the response of malaria to different attack measures.

No technical problems involving the vectors have appeared, and DDT has proved to be effective in all areas in which it was used.

BRITISH HONDURAS

The program has succeeded in making the endemic disease disappear, but because of the receptivity and vulnerability of the country, it must continue epidemiological surveillance operations to prevent the reestablishment of the disease; the cooperation of the immigration authorities has been obtained in taking blood slides and giving presumptive treatment to all persons from neighboring countries entering British Honduras with work permits.

In 1970, a total of 15,522 blood slides were examined and 33 cases were found (five in the area in the consolidation phase, and 28 in the area in attack phase), the positivity rate being 0.2 per cent. Three of the cases from the area in the consolidation phase were classified as autochthonous. All the cases were due to P. vivax infections.

COLOMBIA

Taking the country as a whole, the malaria epidemiological situation in 1970 was similar to that in the previous year. Progress was made in some areas in particular in the areas in the attack phase that have a population of 3,874,000 inhabitants (31.2 per cent of the total population of malarious area) where there was a substantial decrease both in the number of cases, and in the slide positivity rate. The number of cases in these areas fell from 33,938 in 1969 to 27,004 in 1970. The slide positivity rate fell from 9.9 to 8.9 per cent and the annual parasite incidence from 9.0 to 6.7 per 1,000 inhabitants.

In ten land settlement areas with approximately one million inhabitants (8.2 per cent of the total population of the malarious area) transmission persists; they serve as foci from which the infection spreads to other regions; these ten areas are a serious obstacle to the progress of the program.

During the year, in addition to the application of DDT, mass drug administration was stepped up in the area known as "Bajo Cauca-Nechi" in which 17,977 persons live; in addition, the Bajo Cauca areas and the Cucuta region, which have a population of 79,014 inhabitants, received four DDT spraying cycles instead of two, the usual number in the remainder of the country.

The Catatumbo and Sarare regions received special attention, including mass drug administration, in a coordinated program with the Division of Rural Endemic Diseases of Venezuela.

DDT continues to be the insecticide of choice, although in the cotton growing areas of Cesar, some A. albimanus resistance to that insecticide has been observed. The problem now appears to be limited and continues to be studied.

COSTA RICA

The Three-Year Plan, which began in January 1968, ended in late 1970 with fully satisfactory results; in 1967, the year prior to the initiation of the plan, 4,443 cases of malaria were detected among the 164,109 blood slides examined, the SPR being 2.7 per cent. In 1970, the number of cases was 350 and the SPR 0.18 per cent. All the cases were investigated and 45 classified as imported from other countries; 80 cases were due to a single focus, Chacarita, with 3,905 inhabitants. The investigation of the focus showed that the cases had occurred despite the correct application of DDT; entomological observations indicated that the vector was resistant to that insecticide. Mass drug treatment was therefore administered and larvicides were used on small scale to reduce the anopheline density; these measures succeeded in controlling the focus. The use of Propoxur is under consideration in that focus as an additional preventive measure.

A new plan of operations has been drawn up and provides for the continuation of the attack measures in limited areas for an additional two years and epidemiological surveillance for a further three years.

In June 1970, the program was visited by a multidisciplinary group, which included representatives of the Government and the participating international agencies. This group concluded that Costa Rica was a country with a malaria eradication program in which the prospects for eradication were good under current conditions, and that furthermore the objectives could be attained within the established time limit.

CUBA

The malaria eradication program in Cuba completed its consolidation phase and shifted all the originally malarious area into the maintenance phase. The last autochthonous case detected in the locality of El Jobo in the Nicaro Health Area, Mayarf (Oriente Norte) "Dirección Regional", in 1967. Since then no autochthonous cases have been detected.

The program is integrated with the General Health Services. The Government has requested the inclusion of Cuba in the WHO Register of Areas where malaria has been eradicated.

DOMINICAN REPUBLIC

With the exception of two small foci situated on the frontier with the neighboring country, the Dominican Republic kept its territory free of transmission during the year.

Most of the area in the consolidation phase completed three years with no autochthonous cases and was shifted into the maintenance phase; as a result 90.2 per cent of the population of the originally malarious area is in the maintenance phase, 7.0 per cent in the consolidation phase, and 2.8 per cent in the attack phase. The continuation of attack measures in this last mentioned area is foreseen as long as transmission exists in the neighboring country.

During the year 628,221 blood slides were examined and 161 cases were discovered; of these 159 were in areas in the attack phase, and two in areas in the maintenance phase (one autochthonous and one imported).

ECUADOR

Despite the fact that in 1970 the financial difficulties mentioned last year continued, the program improved its field activities, particularly in areas in the attack phase, where 94.5 per cent of the 359,500 sprayings planned were carried out in the first six months of the year, and 94.8 per cent of the 346,900 sprayings planned in the second half of the year. Although antifocal measures could not be applied in all the reinfected localities in the area in the consolidation phase, 34,407 houses were sprayed in foci with the highest transmission.

As a result of the above-mentioned measures and those applied in the previous year, the number of cases was sharply reduced from 50,957, detected in 1969, to 28,375 in 1970, a reduction in the order of 44.3 per cent. The reduction was higher in areas in the attack phase (45.3 per cent) than in areas in the consolidation phase (37.8 per cent). To ensure that this downward trend continues, attack measures must be continued. Furthermore, epidemiological studies must be undertaken in some of the areas in the banana plantation zone, since the situation there has not improved as quickly as in the rest of the country.

EL SALVADOR

1970 was the third and final year of the Three-Year Plan begun in mid 1968. In March 1969 a multidisciplinary group composed of representatives of the Government, UNICEF, USAID, and PAHO/WHO reviewed the program pursuant to Resolution WHA22.39, and concluded that the measures used (DDT and mass drug administration) were not sufficient to interrupt transmission in areas where A. albimanus was resistant to that insecticide.

In the light of the observations of the Strategy Review Team and the recommendations of the Working Group of the Malaria Eradication Program of Central America and Panama, the Government of El Salvador decided to change the plan of operations by interrupting DDT spraying in the area in which vector resistance to the insecticide exceeded 75 per cent and eliminating mass drug treatment because it was poorly accepted by the population. It was planned to spray Propoxur (OMS-33) every three months in La Unión Department, which measures 1,049 km² and has 87,030 inhabitants, and treatment in that area began in the month of August. By the end of the year the population numbering 1,213,736 inhabitants was being protected by DDT.

In 1970, the number of cases detected (45,436) increased in comparison with the previous year (25,299). This increase, in the order of 79.6 per cent, occurred for the most part in the coastal area of the eastern region of the country, which has received priority in the application of new attack measures.

FRENCH GUIANA

Of a population of 45,000 inhabitants, only 3,000 (6.7 per cent) live in areas in the attack phase, and the remainder (93.3 per cent) in areas in the consolidation or maintenance phase.

During the year, 27,967 sprayings were applied in the area in the attack phase and various insecticides (DDT, Dibrom, Abate) were used. The program was planned in association with the *Aedes aegypti* eradication campaign. In addition to spraying operations, the program used salt mixed with amodiaquine. In May 1970, a mixing plant was set up in the Pasteur Institute in Cayenne, the equipment and supplies being provided by PAHO/WHO.

In 1970, 8,237 blood slides were examined and 117 positive cases were detected (1.4 per cent); in the previous year 7,000 slides had been examined and of those 52 (0.7 per cent) were positive.

The malaria situation is influenced by the situation in Surinam with which country activities are well coordinated, and by the situation in Brazil, a country which has provided skilled labor for development projects (Kourou) in contacts in the common frontier areas (Rio Oyapock).

GUATEMALA

The strategy of the malaria eradication program in Guatemala was reviewed by a multidisciplinary group from 27 April to 16 May in compliance with Resolution WHA22.39

On the basis of the report submitted, the Government approved for 1971 and following years, a new open-ended eradication plan, which will continue the Three-Year Plan which terminated on 31 December 1970. The plan provides for the application of Propoxur in the area in which the vector is resistant to DDT.

The attack measures used in 1970 were: six-month sprayings with DDT, three-month sprayings in land settlement areas in the Sebol region, Alta Verapaz; antilarval sprayings with fenthion in the city of Jutiapa, the Valley of Salamá, and Puerto Barrios, and mass drug administration, which has been gradually diminishing because of its low level of acceptance by the population.

Although these measures have not succeeded in interrupting transmission, the situation has been stabilized at a low level of transmission. The problem areas are inhabited by 11.2 per cent of the population of the malarious area and produce 49.4 per cent of the total number of cases.

During the year 447,706 blood slides were examined, and 11,044 cases of malaria detected (2.5 per cent positivity rate), which represents a parasite incidence of 4.7 cases per 1,000 inhabitants in the malarious area. In 1969, 521,336 blood slides were examined and 10,494 cases were detected (2.0 per cent positivity rate).

GUYANA

In 1970, attack measures continued to be applied on a limited scale in the interior of the country (45,000 inhabitants) and they included the application of DDT to 2,411 houses (73.8 per cent of the number originally planned) and the administration of medicated kitchen salt of which 169,642 pounds were distributed through the ordinary market channels.

During the year, 18 cases of malaria were detected, none of which were autochthonous.

By the end of the year, the area that was in the attack phase was shifted into the consolidation phase, with the result that 6.2 per cent of the population of Guyana was in the consolidation phase and 93.8 per cent in the maintenance phase.

HAITI

Program activities continued in 1970 on the basis of DDT spraying; of the 900,000 houses in the malarious area which has a population of 3,588,000 inhabitants, that is, 73.7 per cent of the total of the country, 576,000 houses were sprayed in the first cycle and 777,000 in the second. Antifocal measures such as drainage and larviciding were applied in addition to presumptive and radical treatment of the cases detected.

The measures applied were unable to arrest the natural tendency of malaria, since they were not carried out on a large enough scale; in 1970, 10,658 cases were found, the positivity rate being 3.0 per cent, whereas in 1969, 5,005 positive slides were found. The annual parasite incidence per 1,000 inhabitants in 1970 was 3.0. However, the malaria problem became focalized since during the year 70 per cent of the cases were found in 3.4 per cent of the localities in the malarious area.

In April a system of evaluating the effectiveness of the attack measures was established, using six indicator districts representing different epidemiological conditions; the monthly analysis in 1970 showed a reduction of the problem in five, and an increase in one of them, the area surrounding Lake Miragoane where efforts are being made to increase attack measures.

HONDURAS

In 1964, a Three-Year Plan was prepared, based on the epidemiological situation in the country. Operations began in 1966 but coverage was insufficient because the situation worsened in the period 1964-1966. The plan was enlarged in 1968 and is to continue until early 1971.

In April 1970, the strategy of the program was reviewed by a multidisciplinary group pursuant to Resolution WHA22.39. On the basis of the observations of the group, the Government adopted a new plan of operations for 1971, providing for the application of four three-month sprayings with Propoxur (OMS-33) in part of the area in which A. albimanus is resistant to DDT and produces the largest number of cases (Municipality of Marcovia, Choluteca Department). The number of cases rose from 29,584 in 1969 to 34,537 in 1970, and the positivity rate of the slides examined rose from 5.0 to 9.7 in the years indicated. The incidence per 1,000 inhabitants of the malarious area was 15.7 in 1970.

The area in which the vector is resistant to DDT contains 9.1 per cent of the population of the total malarious area, and produced 63 per cent of the cases in the country. The possibility of eradication in the short term depends on the application of more effective attack measures.

MEXICO

The program continued with the activities of the so-called "Transitional Plan".

For the intensification of activities, especially in the Gulf of Mexico watershed where various outbreaks occurred in areas in the consolidation phase, a considerable budget increase became available in the second half of the year. As a result, a part of the area in this

phase was shifted in to the attack phase. At present, 46.9 per cent of the population of the originally malarious area, is in areas in the consolidation phase, and the remainder in areas in the attack phase.

Because the increase in operations began in the latter part of the year, it was not possible to prevent the production of a larger number of cases in 1970 than in 1969. In 1970, 61,158 cases were detected in 1,889,877 slides examined (3.2 per cent) which represents an incidence of 2.5 per 1,000 inhabitants in the malarious area. In 1969, 52,126 cases were found, the positivity rate being 2.1 per cent.

It is expected that the increase in activities up to an adequate level will easily eliminate malaria in the area inhabited by 60.7 per cent of the population of the originally malarious area, that slower progress will be made in areas with 22.2 per cent of the population, and in areas with the remaining 17.1 per cent there are technical problems such as vector resistance to DDT and problems related to human ecology.

NICARAGUA

Pursuant to Resolution WHA22.39, the Government invited the international agencies cooperating in the program to establish a team to revise the strategy; this group was directed by a national official, who was the planning officer of the health sector.

On the basis of the recommendations of the strategy review team, the Government prepared a new plan of operations whose goal is to limit the problem and to reduce incidence to a low level, thereby permitting efficient application of antifocal measures.

The year 1970 was the last year of the Three-Year Plan. The measures applied were unable to interrupt transmission because A. albimanus showed resistance to DDT and malathion, and, furthermore, the mass drug administration encountered difficulties, in particular a low level of acceptance by the public.

In addition to technical problems, there are administrative or financial problems; however, the Government has prepared new action plans, which include the use of Propoxur (OMS-33) in that part of the area in which the vector is resistant to DDT and produces the largest number of cases. As a result, on 6 April 1970, Propoxur began to be applied in localities with the highest incidence (236 localities with 15,842 houses) on the Pacific seaboard.

In 1970, 281,386 blood slides were examined and 27,260 cases of malaria were detected (9.7 per cent positivity) the annual parasite incidence being 13.7 cases per 1,000 inhabitants of the originally malarious area. In 1969, 498,119 blood slides were examined, and 16,043 cases were found (3.2 per cent). Therefore, the situation in 1970 worsened.

PANAMA

In May 1970, the program was visited by a multidisciplinary group for the revision of the strategy. It considered it feasible to eradicate malaria in the country, since there were no technical problems, persistence of transmission was focalized in specified areas, financial and human resources were available, and the attitude of the community was favorable. The positivity rate of the blood slides examined showed a downward trend during the year, from 5.1 per cent in January to 0.4 per cent in December.

The year 1970 was the second of the Three-Year Plan; progress, as reflected in the slide positivity rates mentioned, was satisfactory.

During the year 237,477 blood slides were examined and 4,584 cases (1.9 per cent) were found, the annual parasite incidence being 3.3 cases per 1,000 inhabitants in the malarious area. In the previous year, 94,596 slides were examined, 5,938 cases (6.3 per cent) were found to be positive and the annual parasite incidence was 4.4 per 1,000 inhabitants.

Provided the operations are carried out as planned, and no technical entomological problems occur, the program will move towards success within a short time. A chloroquine-resistant strain of P. falciparum is known to exist and calls for the use of other medicaments for obtaining radical cure.

PARAGUAY

The program in Paraguay has continued as planned. Progress has been satisfactory and positivity rates have been reduced from 18.2 per cent in 1968 to 8.0 per cent in 1969, and 0.9 per cent in 1970. The number of cases, which was 50,304 in 1967, fell to 1,429 in 1970.

The program is expected to achieve its goal within the time limits established.

So far the problem involves small groups of the population living in makeshift houses and temporary shelters which cannot be well protected by insecticide sprayings. Special attack measures are being used since, because of their nomadic habits, these groups may spread the problem. In addition, some groups of migratory workers move to areas outside the country where they may catch the disease and produce active foci on their return home.

For this reason, surveillance measures and antifocal attack measures must be planned in these areas, even when the program has reached the consolidation phase on a national scale.

In 1970, 157,587 blood slides were examined, and 1,429 cases of malaria (0.9 per cent) were detected; the annual parasite incidence was 0.7 per 1,000 inhabitants of the malarious area. In the previous year 129,509 blood slides were examined, of which 10,307 were positive (8.0 per cent).

PERU

During the year, an area of 3,042 km² with a population of 57,705 was shifted from the attack phase to the consolidation phase, and another area of 11,322 km² with a population of 130,298 was shifted from the consolidation phase to the maintenance phase. With these changes the country has 24.4 per cent of the population of the malarious area in the attack phase, and 75.6 per cent in the consolidation and maintenance phases.

In the areas which are still in the attack phase, malaria incidence increased; thus in 1969, 2,850 cases were detected, representing 2.0 per cent of the blood slides examined in that phase, and in 1970, 4,007 (2.4 per cent) were detected. In the areas in the maintenance phase, two outbreaks occurred, but were being brought under control towards the end of the year. This situation led to a response on the part of the national authorities which assigned additional funds (23 per cent) to the program and a new budgetary increase (6 per cent) is expected in 1971.

During the year, 310,237 blood slides were examined, 4,494 malaria cases were found (1.4 per cent) and the annual parasite incidence was 0.9 cases per 1,000 inhabitants. In 1969, 263,344 blood slides were examined of which 3,168 were found to be positive (1.2 per cent).

Malaria surveillance in areas of the maintenance phase is the responsibility of the general health services.

The prospects of the country achieving eradication are good, the principal difficulties being operational problems in the Amazon region.

SURINAM

Considering the program as a whole, the situation improved, as shown by the shifting of part of the area in the area in the consolidation phase to the maintenance phase; as a result, 73.6 per cent of the population is in areas in the maintenance phase, 11.2 per cent in the consolidation phase, and 15.3 per cent in the attack phase.

The progress made in the area in the attack phase was not satisfactory; rather there was a slight increase in the number of cases; the increase was greater in some areas, such as Tapanahony River, where the positivity rate, which was 4.3 per cent in 1969, rose to 14.8 per cent in 1970.

Attack measures continue to be based on the application of insecticides with low indices of coverage and the distribution of medicated salt. In this last activity there were a number of failures since in the first six months of 1970, only 186,104 pounds of salt were distributed compared with 307,246 pounds in the first three months of 1969.

In 1970 48,702 blood slides were examined, and 1,019 cases of malaria were discovered (2.1 per cent) in the whole country; in the previous year 38,194 had been examined and 741 (1.9 per cent) found positive.

VENEZUELA

The distribution of the population of the country by campaign phases remains unchanged, 94.4 per cent being in the maintenance phase and 5.6 per cent in the attack phase.

For the entire country, malaria incidence increased from 8,660 cases in 1969 (1.8 per cent positive slides) to 15,145 cases (5.6 per cent) in 1970.

The increase in transmission in areas in the attack phase affected adjacent areas in the maintenance phase, especially those in which land settlement schemes are going on along recently constructed roads.

The territory in the attack phase consists of two malarious areas, the western and the southern. Both have serious technical problems, which in the first are due principally to the behaviour of the vector A. nufeztovari and in the second, to human ecology. Three-month sprayings of DDT, and the use of drugs, larvicides, fogging, and peridomestic insecticides, where their application is feasible, have not succeeded in arresting the upward trend of transmission in the paraquinquenal wave characteristic of malaria in the country.

Plans have been made to use Propoxur (OMS-33) as a substitute for DDT, in a pilot project in the area of distribution of A. nufeztovari.

C. Field operations

The application of insecticides of residual effect in dwellings in the malarious regions continues to be the principal attack method in most of the countries of the Hemisphere.

During the year, a total of 15,786,797 sprayings were applied (Table No.11) compared with 14,264,304 in 1969. This increase was due principally to the increase in activities in Ecuador, Haiti, and Mexico; the increase in the number of sprayings applied in these countries offset or exceeded the reductions in other countries, such as Brazil, Paraguay, Venezuela, and in the areas in the countries of Central America in which the vector A. albimanus is resistant to DDT.

Mass drug administration was used as an alternative or supplementary measure in a limited number of countries and as a focal attack measure in some epidemic outbreaks.

Other supplementary measures used were the distribution of kitchen salt mixed with chloroquine or with amodiaquine in Guyana, French Guiana and Surinam; the application of larvicides in Nicaragua; and drainage and larviciding in Haiti.

The insecticide Propoxur (OMS-33) was used with effect from the month of April in 15,842 dwellings in 236 localities with the highest malaria incidence in Nicaragua where the vector is resistant to DDT. It was also used in an area of El Salvador containing 16,832 dwellings. During the year plans were made for the increased use of this insecticide in various foci in Nicaragua, El Salvador, Honduras and Guatemala; these plans will be implemented in 1971.

Tables Nos. 12 to 16 show the number of persons employed on the malaria eradication program by country and by category, at the end of 1970. There were 33,095 full-time employees, and 184 part-time employees, an increase of more than 770 persons compared with the previous year. As indicated in Table No. 12, an increase of about 2,500 spraymen reflects the intensification of attack measures. The number of physicians and engineers increased from 300 in 1960 to 387 in 1970, (Tables Nos. 13 and 14) but the number of entomologists and entomologists' assistants fell from 324 to 228. The staff employed in evaluation operations remained the same; on the other hand, there was a reduction in the number of administrative and transport personnel.

UNICEF continued to provide most of the programs with supplies and equipment. The type of transport equipment and number of units per country is shown in Table No. 17; UNICEF sent vehicles and spare parts for vehicles to the countries as well as tools for their maintenance; it also provided insecticides and spraying equipment, and some materials for epidemiological surveillance operations. In other countries, all the equipment used was purchased by the Governments themselves using national funds, or funds obtained as loans under bilateral agreements.

The collection and examination of blood slides was continued, particularly the blood of febrile persons, or of persons who had recently had fever, in order to evaluate the results of attack operations and to monitor the situation in the areas in the consolidation and the maintenance phases. Blood samples were collected through routine case detection, both passive and active; in exceptional circumstances mass surveys were made, particularly in connection with the mass distribution of drugs.

Statistical and descriptive information is presented in the country by country review of the program in Chapters I-B and II.

Table No. 18 contains a comparative summary of the results of active and passive case detection in 1970. During the year 9,925,187 blood slides were examined, and 344,027 cases of malaria were detected. Passive case detection accounted for 37.8 per cent of the total of the sample; however, it produced 66.2 per cent of the cases detected. The situation was therefore, similar to that of the preceding year, when passive case detection produced 63.3 per cent of the cases.

In order to interpret these data, it is necessary to consider the individual situation of each country; in some countries there was an increase in malaria incidence, while in others the improvement in their situation was marked.

Table 11

SUMMARY OF HOUSES SPRAYED WITH RESIDUAL INSECTICIDES, BY COUNTRY AND BY CYCLE, 1970

Country or other political unit	1st Cycle			2nd Cycle			3rd Cycle			4th Cycle			Total sprayings
	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	Houses planned	Houses sprayed	% sprayed	
Argentina	9 606	9 239	96.2	9 606	5 288	55.0	-	-	-	-	-	-	50 000 ^{a)}
Bolivia	42 220	43 233	102.4	24 178	16 187	66.9	-	-	-	-	-	-	66 922 ^{b)}
Brazil	3 815 129	3 484 045	91.3	3 857 032	2 136 607	55.4	-	-	-	-	-	-	5 620 652
Colombia (Semest.) ..	427 433	415 506	97.2	426 724	404 638	94.8	-	-	-	-	-	-	820 144
(Quarterly cycles) ..	23 843	23 271	97.6	24 286	23 377	96.3	14 142	13 509	95.5	14 461	13 595	94.0	73 752
(Annual cycle).....	31 314	28 853	92.1	-	-	-	-	-	-	-	-	-	28 853
Costa Rica	67 906	65 509	96.5	69 624	62 835	90.2	-	-	-	-	-	-	128 344
Dominican Republic ..	66 729	63 938	95.8	58 970	56 874	96.4	-	-	-	-	-	-	120 812
Ecuador	359 494	339 793	94.5	346 930	328 728	94.8	-	-	-	-	-	-	702 928 ^{c)}
El Salvador (Sem. DDT)	283 480	273 886	96.6	269 983	264 597	98.0	-	-	-	-	-	-	538 483
(Propoxur)	-	-	-	-	-	-	16 832	16 151	96.0	16 655	15 707	94.3	31 858
Guatemala (Semest.) ..	397 810	326 349 ^{d)}	82.0	216 798	102 378 ^{e)}	47.2	-	-	-	-	-	-	428 727
(Quarterly cycles) ..	-	-	-	-	-	-	3 497	3 426	98.0	3 497	4 771	136.4	8 197
Guyana	3 267	2 883	88.2	-	-	-	-	-	-	-	-	-	2 883
Haiti	579 818	576 927	99.5	799 818	777 773	97.2	-	-	-	-	-	-	1 354 700
Honduras (Annual) ...	190 386	191 383	100.5	-	-	-	-	-	-	-	-	-	199 777 ^{f)}
(Quarterly cycles)...	-	-	-	-	-	-	22 526	21 903	97.2	22 180	26 770	120.7	48 673
Mexico (Sem. Attack).	1 541 354	1 483 857	96.3	1 883 060	1 824 910	96.9	-	-	-	-	-	-	3 308 767
(Semest. Consolid.) ..	249 694	251 184	100.6	107 940	106 104	98.3	-	-	-	-	-	-	357 288 ^{g)}
Nicaragua (DDT Sem.)	161 390	152 595	94.6	166 326	153 410	92.2	-	-	-	-	-	-	306 005
(Malathion ea./4 Mo.)	12 618	11 866	94.0	13 001	7 338	56.4	-	-	-	-	-	-	19 204
(Propoxur Quarterly)	-	-	-	15 842	15 514	98.0	27 288	24 653	90.3	28 085	24 687	87.9	64 854
Panama (Semestrial) ..	208 281	203 098	97.5	189 385	187 414	99.0	-	-	-	-	-	-	390 512
(Quarterly cycles)...	-	-	-	-	-	-	20 123	24 534	122.0	24 587	14 782	60.1	39 316
Paraguay	317 142	303 370 ^{d)}	95.7	308 357	131 586 ^{e)}	42.7	-	-	-	-	-	-	434 956
Peru (Semestrial)....	54 735	54 653	99.9	52 519	44 786	85.3	-	-	-	-	-	-	99 439
(Quarterly cycles)...	27 526	29 533	107.3	27 925	28 336	101.5	-	-	-	30 503	31 415	103.0	89 284
Venezuela (Semest.) ..	73 487	41 525	56.5	47 511	47 391	99.7	-	-	-	-	-	-	88 916
(4 Months cycles)....	20 665	21 759	105.3	29 570	31 642	107.0	30 758	28 624	93.1	-	-	-	82 025
(Quarterly cycles)...	81 856	64 563	78.9	60 906	58 610	96.2	53 200	52 666	99.0	53 341	50 986	95.6	226 825
British Honduras	11 127	11 443	102.8	11 735	7 772	66.2	-	-	-	-	-	-	19 215
French Guiana.....	28 050	27 967	99.7	-	-	-	-	-	-	-	-	-	27 967
Surinam	15 400	3 849 ^{h)}	25.0	15 400	2 670 ^{h)}	17.3	-	-	-	-	-	-	6 519
Total	9 101 760	8 506 077	93.5	9 033 426	6 826 765	75.6	188 366	185 466	98.5	193 309	182 713	94.5	15 786 797

a) Includes 35 473 emergency sprayings in consolidation phase areas. b) Includes 7 502 focal sprayings. c) Includes 34 407 emergency sprayings. d) First complete cycle from April to September. e) Cycle not yet finished. f) Includes 8 394 emergency sprayings. g) Does not include 5 803 houses sprayed in 99 localities from Zone V. h) Includes houses sprayed with DDT and dieldrin.

Table 12

PERSONNEL EMPLOYED IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS
31 DECEMBER 1969 AND 1970, BY CATEGORY

(Part-time personnel in parentheses)

Title		1969	1970
SPRAYING OPERATIONS	Engineers.....	93	133 (1)
	Spraying Chiefs	305	316 (2)
	Sector Chiefs	1 298	782
	Squad Chiefs	2 393	3 011 ^{a)}
	Spraymen	10 554 (85)	13 014 (101) ^{a)}
	Draftsmen	214 (1)	119
	SUB-TOTAL	14 857 (86)	17 375 (104)
EPIDEMIOLOGICAL OPERATIONS	Physicians	207 (4)	254 (4)
	Entomologists	80	56 (1)
	Entomologist Assistants	244	172 (3)
	Statisticians and Statisticians' Assistants	260	172
	Evaluation Inspectors	912 (1) ^{b)}	1 638 ^{b)}
	Evaluators	7 739 ^{b)}	7 459 (55) ^{b)}
	Microscopists	1 064 (6)	982 (13)
SUB-TOTAL	10 506 (11)	10 733 (76)	
ADMINISTRATION AND OTHERS	Administrators	156 (1)	100
	Administrative Assistants	1 697	536
	Accountants	43	43
	Disbursing Officers	58	59
	Storekeepers	75	89
	Storekeeper's Assistants	82	71
	Secretaries	374	401
	Others	1 373 (63)	1 097
SUB-TOTAL	3 858 (64)	2 396	
TRANSPORT	Transport Chiefs, Mechanics and Assistant Mechanics	828	729
	Drivers.....	1 538	1 405 (2)
	Motorboat Operators	436	325 (2)
	Boatmen	322	132
	SUB-TOTAL	3 124	2 591 (4)
GRAND TOTAL.....		32 345 (161)	33 095 (184)

a) Includes personnel from the larviciding program.

b) Includes personnel with same category from the mass drug distribution program.

Table 13

PERSONNEL EMPLOYED IN SPRAYING OPERATIONS IN MALARIA ERADICATION PROGRAMS
IN THE AMERICAS - 31 DECEMBER 1970

(Part-time personnel in parentheses)

Country or other political unit	Total	Engineers	Sanitarians or Spraying Chiefs	Sector Chiefs	Squad Chiefs	Spraymen	Draftsmen
Argentina	62	2	9 ^{a)}	8	11	30	2
Bolivia	49 (81)	-	9 ^{a)}	24 ^{a)}	-	15 (81)	1
Brazil	7 382	53	56	75	1 142	6 037	19
Colombia	1 238	11	14	109	307	780	17
Costa Rica	146	-	10	25	31	77	3
Dominican Republic	62	1	2	-	9	49	1
Ecuador	652	3	8	45	109	485	2
El Salvador	388	1	6	17	68	294 ^{b)}	2
Guatemala	494	1	11 ^{c)}	31 ^{a)}	63	384 ^{b)}	4
Guyana	18	-	1	-	2	14	1
Haiti	1 246	1	13 ^{d)}	22	214	990	6
Honduras	181	-	7	8	28	137	1
Mexico	3 206	41	105	245	715	2 068	32
Nicaragua	371	1	7	29	63	269	2
Panama	376	1	8	31	51	282 ^{e)}	3
Paraguay	478	2	8 ^{a)}	41	81	337	9
Peru	245	4	20	27	42	146	6
Trinidad and Tobago	95	-	1	1	2	88 ^{b)}	3
Venezuela	500	2	-	35	62	399	2
British Honduras	19	-	1	-	3	15	-
Canal Zone	(23)	(1)	(2)	-	-	(20) ^{b)}	-
French Guiana	79	-	12	3	8	55	1
Puerto Rico	76	9	6	-	-	60 ^{b)}	1
Surinam	12	-	2	6	-	3	1
Total	17 375 (104)	133 (1)	316 (2)	782	3 011	13 014 (101)	119

a) Performing evaluation activities also. b) Including personnel from the larviciding program. c) Includes 8 Chiefs of Zone with functions as spraying supervisors and drug distributors. d) Supervisors. e) Includes personnel with same category from mass drug distribution activities.

Table 14
**PERSONNEL EMPLOYED IN EPIDEMIOLOGICAL EVALUATION OPERATIONS IN MALARIA ERADICATION
 PROGRAMS IN THE AMERICAS - 31 DECEMBER 1970**

(Part-time personnel in parentheses)

Country or other political unit	Total	Physicians	Entomologists	Assistant Entomologists	Statisticians and Statisticians' Assistants	Evaluation Inspectors	Evaluators	Microscopists and laboratory personnel
Argentina	223	3	1	1	2	26	163	27
Bolivia	130	8	-	2	6	7 ^{a)}	94 ^{a)}	13
Brazil	4 157	71 ^{b)}	13	29	22	692 ^{c)}	3 068	262
Colombia	1 118	19	5	2	19	157 ^{a)}	868 ^{a)}	48
Costa Rica	162	2	-	2	2	5 ^{a)}	135 ^{a)}	16
Cuba	225	-	-	-	-	-	160	65
Dominican Republic	217	2	1	3	4	23	143	41
Ecuador	199	10	4	3	4	112 ^{a)}	31 ^{a)}	35
El Salvador	470	7	1	10	7	60 ^{a)}	349 ^{a)}	36
Guatemala	358	5	1	11	7	17 ^{a)}	288	29
Guyana	39 (1)	1 (1)	-	-	3	-	30	5
Haiti	226	10	1	10	13	23	123 ^{a)}	46
Honduras	136	4	-	7	11	13	60	41
Jamaica	42 (56)	13 (1)	-	6	3	12	(55) ^{d)}	8
Mexico	1 488	62	16	6	-	388	891	125
Nicaragua	192	4	1	11	10	7	130	29
Panama	218 (1)	1	1	6	8	17 ^{a)}	161	24 (1)
Paraguay	98	5	3	7	10	-	60	13
Peru	364	10	4	-	25	-	262	63
Trinidad and Tobago	119	1	1	38	1	1	69	8
Venezuela.....	486	11	2	16	9	71	341	36
British Honduras	12 (1)	(1)	-	-	-	1	10	1
Canal Zone	(17)	(1)	(1)	(3)	-	-	-	(12)
Dominica .....	...	...	...	...	...	...	...	...
French Guiana	7	1	1	2	-	1	-	2
Grenada	1	1	-	-	-	-	-	-
Puerto Rico	8	2	-	-	3	2	-	1
St. Lucia .....	...	...	...	...	...	...	...	...
Surinam	38	1	-	-	3	3	23	8
Total	10733 (76)	254 (4)	56 (1)	172 (3)	172	1 638	7 459 (55)	982 (13)

... No information.

a) Includes personnel with same category from mass drug distribution activities. b) Includes 8 veterinarians. c) Performing activities as Sector Chiefs also.

d) Includes 25 insecticide inspectors.

Table 15

PERSONNEL EMPLOYED IN ADMINISTRATIVE AND OTHER SERVICES IN MALARIA ERADICATION PROGRAMS
IN THE AMERICAS - 31 DECEMBER 1970

(Part-time personnel in parentheses)

Country or other political unit	Total	Administrators	Administrative Assistants	Accountants	Disbursing Officers	Storekeepers	Storekeepers' Assistants	Secretaries	Other
Argentina	67	5	24	-	-	8	-	-	30
Bolivia	30	7	3	1	1	1	2	7	8
Brazil	468	41	122	4	10	9	4	5	273
Colombia	252	1	18	10	14	18	4	70	117
Costa Rica	47	1	8	1	5	2	-	16	14
Dominican Republic	42	1	4	1	-	2	3	16	15
Ecuador	106	6	1	5	8	4	3	20	59
El Salvador	71	1	12	-	1	2	4	9	42
Guatemala	93	1	2	4	3	2	3	23	55
Guyana	4	-	-	-	-	2	1	1	-
Haiti	192	3	3	-	1	4	2	27	152
Honduras	57	1	8	1	-	2	1	13	31
Jamaica	31	-	10	-	-	1	2	3	15
Mexico	599	15	279	3	14	15	20	141	112
Nicaragua	52	6	6	5	-	6	3	10	16
Panama	61	3	17	3	-	2	-	10	26
Paraguay	62	1	11	1	1	1	6	11	30
Peru	82	4	7	3	-	4	8	13	43
Trinidad and Tobago ...	49	1	1	1	-	2	4	1	39
Venezuela	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)	(a)
British Honduras	4	1	-	-	-	-	-	2	1
French Guiana	3	-	-	-	-	-	-	2	1
Surinam	24	1	-	-	1	2	1	1	18
Total	2 396	100	536	43	59	89	71	401	1 097

a) Services performed by the "Dirección de Malariología y Saneamiento Ambiental" in charge of different programs of environmental sanitation.

Table 16

PERSONNEL EMPLOYED IN TRANSPORT SERVICES IN MALARIA ERADICATION PROGRAMS
IN THE AMERICAS - 31 DECEMBER 1970

(Part-time personnel in parentheses)

Country or other political unit	Total	Transport Chiefs, mechanics and assistant mechanics	Drivers	Motorboat operators	Boatmen
Argentina	59	29	27	3	-
Bolivia	45	9	31	5	-
Brazil	986	192	751	43	-
Colombia	432	108	78	190	56
Costa Rica	22	9	13	-	-
Dominican Republic	38	16	22	-	-
Ecuador	82	10	45	15	12
El Salvador	112	27	85	-	-
Guatemala	69	23	46	-	-
Guyana	20	1	6	7	6
Haiti	59	35	21	1	2
Honduras	50	17	32	1	-
Jamaica	38	4	34	-	-
Mexico	199	138	42	19	-
Nicaragua	72	13	45	14	-
Panama	21	13	7	1	-
Paraguay	97	19	73	5	-
Peru	37	22	15	-	-
Trinidad and Tobago	15	-	15	-	-
Venezuela.....	35	35	(a)	(a)	(a)
British Honduras	2	2	-	-	-
Canal Zone.....	(4)	-	(2)	(2)	-
French Guiana.....	19	1	7	1	10
Surinam	82	6	10	20	46
Total.....	2 591 (4)	729	1 405 (2)	325 (2)	132

a) Services performed by personnel of the "Dirección de Malariología y Saneamiento Ambiental" in charge of different programs of environmental sanitation.

Table 17

MEANS OF TRANSPORT IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1970

Country or other political unit	Trucks (3 tons or more)		Trucks and "Pick-up" (less than 3 tons)		Jeeps		Automobiles and station wagons		Motorcycles		Bicycles		Motor boats		Boats without motor		Saddle and pack animals	Other	
	a	b	a	b	a	b	a	b	a	b	a	b	a	b	a	b		a	b
Argentina	3	2	50	47	18	22	5	4	-	-	20	25	3	-	-	1	-	-	-
Bolivia	-	-	11	4	34	8	1	1	-	30	25	23	23	10	-	-	95	61 ^{c)}	11
Brazil	65	21	371	53	488	349	41	12	-	-	719	78	431	11	50	10	2 334	-	-
Colombia	12	3	142	8	97	19	31	5	22	1	136	20	132	49	100	-	1 558	-	-
Costa Rica	1	-	14	3	15	1	3	-	25	7	60	40	22	8	-	-	44	-	-
Cuba	-	-	9	8	48	15	-	-	-	-	-	-	-	-	-	-	-	-	-
Dominican Republic	1	-	72	-	2	-	6	-	134 ^{d)}	-	-	-	-	-	-	-	-	-	-
Ecuador	2	1	30	10	24	15	7	1	40	10	25	-	15	-	25	-	69	30 ^{e)}	20 ^{e)}
El Salvador	1	-	46	14	29	13	8	-	62	55	16	2	8	-	-	-	-	-	-
Guatemala	2	-	52	8	35	11	16	-	117	9	133	47	10	-	2	-	-	-	-
Guyana	1	-	1	-	6	2	-	-	-	-	10	-	13	-	-	-	3	-	-
Haiti	1	-	27	-	33	-	4	-	-	-	-	-	3	-	-	-	-	-	-
Honduras	2	2	36	18	33	16	8	2	38	47	10	40	2	2	-	-	209	-	-
Jamaica	1	-	2	-	33	-	2	-	-	-	-	-	-	-	-	-	-	-	-
Mexico	28	9	365	120	371	72	23	6	-	-	-	-	21	13	-	-	2 344	-	-
Nicaragua	2	-	28	8	38	-	13	-	19	-	-	-	27	-	-	-	-	-	-
Panama	2	1	50	7	32	1	11	2	45	11	-	-	50	25	59	6	-	-	-
Paraguay	2	-	80	11	-	10	14	1	36	4	-	-	21	-	-	-	-	12	-
Peru	2	-	48	2	11	6	47	13	-	-	-	-	117	-	6	-	-	-	-
Trinidad and Tobago	-	2	-	-	10	3	-	-	-	-	-	-	-	-	-	-	-	-	-
Venezuela	6	-	142	-	96	-	35	-	18	-	333	-	124	-	-	-	647	36 ^{f)}	-
British Honduras	-	-	1 ^{g)}	4	4	3	1	-	-	-	2	-	7 ^{g)}	2	-	-	-	-	-
Canal Zone	-	-	2 ^{g)}	-	-	-	-	-	-	-	-	-	2 ^{g)}	-	2 ^{g)}	-	-	-	-
French Guiana	1	-	1	-	8	-	-	-	-	-	-	-	3	-	-	-	-	6 ^{e)}	-
Surinam	1	-	2	2	-	-	4	4	11	4	4	-	19	2	-	-	-	70 ^{e)}	-
Total	136	41	1 582	327	1 465	566	280	51	567	178	1 493	275	1 053	122	244	17	7 623	220	31

a) In good condition. b) In bad condition. c) Airplanes. d) Property of the users. e) Out-board motors. f) Fogging machines. g) Part-time.

Table 18

COMPARATIVE RESULTS OF ACTIVE AND PASSIVE CASE DETECTION IN MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1970

Country or other political unit	Active case detection					Passive case detection						Total	
	Average number of evaluators	Blood slides			Average production per evaluator per month	Average number of notification posts	Average of notification post producing slides per month	Blood slides			Average of slides per month per productive notification post	Blood slides	
		Examined	Positive	Per cent				Examined	Positive	Per cent		Examined	Positive
Argentina	114	48 825	64	0.1	35.7	...	214	46 585	22	0.05	18.1	95 410	86
Bolivia	86	135 992	3 142	2.3	131.8	2 614	337	31 273	3 720	11.9	7.7	167 265	6 862
Brazil	2 694	1 504 535	18 318	1.2	46.5	19 902	9 013	525 924	36 326	6.9	4.9	2 030 459	54 644
Colombia	817	426 062	12 539	2.9	43.5	11 181	5 506	259 350	19 733	7.6	3.9	685 412	32 272
Costa Rica	123	183 171	195	0.1	124.1	1 098	207	12 313	155	1.3	5.0	195 484	350
Cuba .....	...	116 512	-	-	-	...	...	467 572	1	0.0	-	584 084	1
Dominican Republic	142	435 838	128	0.03	255.8	4 885	2 088	192 383	33	0.02	7.7	628 221	161
Ecuador	107	72 360	1 151	1.6	56.4	5 910	3 572	288 519	27 224	9.4	6.7	360 879	28 375
El Salvador	105	224 429	10 161	4.5	178.1	2 434	2 234	347 944	35 275	10.1	13.0	572 373	45 436
Guatemala	99	253 700	5 083	2.0	213.5	4 155	2 130	194 006	5 961	3.1	7.6	447 706	11 044
Guyana	21	59 346	15	0.03	235.0	174	25	4 277	3	0.1	14.2	63 623	18
Haiti	59	207 714	3 967	2.0	293.4	6 686	2 350	149 652	6 691	4.5	5.3	357 366	10 658
Honduras	88	114 364	7 549	6.6	108.3	2 805	1 711	243 072	26 988	11.1	11.8	357 436	34 537
Jamaica .....	...	6 457	-	-	-	...	...	53 360	2	0.0	-	39 817	2
Mexico	506	1 599 285	33 101	2.1	263.4	47 462	4 544	290 592	28 057	9.7	5.3	1 889 877	61 158
Nicaragua	122	108 895	6 207	5.7	74.4	3 492	1 594	172 491	21 053	12.2	9.0	281 386	27 260
Panama	77	200 152	3 336	1.7	216.6	1 169	444	37 325	1 248	3.3	7.0	237 477	4 584
Paraguay	60	53 005	182	0.3	73.6	2 632	1 224	104 582	1 247	1.2	7.1	157 587	1 429
Peru	162	202 114	2 681	1.3	104.0	4 800	1 416	108 123	1 813	1.7	6.4	310 237	4 494
United States of America	-	-	-	-	-	-	-	1 531	4 245	-	-	1 531	4 245
Trinidad and Tobago ...	...	5 096	-	-	-	...	...	20 205	1	0.0	-	25 301	1
Venezuela	1 537	153 440	7 905	5.1	8.3	2 258	493	118 034	7 240	6.1	20.0	271 474	15 145
British Honduras	10	11 190	12	0.1	93.3	137	40	4 332	21	0.5	9.0	15 522	33
Canal Zone .....	...	1 798	3	0.2	-	-	...	33 664	54	0.2	-	35 462	57
Dominica .....	...	...	...	...	...	...	...	...	...	...	...	...	...
French Guiana .....	...	6 847	28	0.4	-	11	...	1 390	89	6.4	-	8 237	117
Grenada	-	-	-	-	-	-	-	644	-	-	-	644	-
Guadeloupe .....	-	-	-	-	-	...	...	56 215	-	-	-	56 215	-
Puerto Rico	-	-	-	-	-	-	-	...	39	...	-	...	39
St. Lucia .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Surinam	30	39 192	365	0.9	108.9	80	11	9 510	654	6.9	72.0	48 702	1 019
Total	-	6 170 319	116 132	2.0	-	-	-	3 754 868	227 895	6.1	-	9 925 187	344 027

... No information.

D. Coordination of activities of malaria eradication programs and general health services

In the malaria eradication program, it is important, when the maintenance phase is reached, for the general health services in the country to have a sufficient infrastructure to enable them to assume responsibility for surveillance. Accordingly, an intercountry project begun in 1966, has been providing advice on the coordination of the activities of general health services and malaria eradication programs.

In some countries, adequate surveillance has been achieved in the maintenance phase through the general health services, while in others satisfactory coverage in surveillance has not been achieved and has led to outbreaks of malaria in areas in the maintenance and consolidation phases.

In Bolivia, a seminar on malaria surveillance was held for 22 medical officers attached to general health services in the areas in the consolidation phase.

In Brazil, the State of Rio de Janeiro has a program for integrating the malaria service into the general health services, in which the staff of the malaria eradication program, in coordination with those of the health services, undertakes activities relating to immunizations, environmental health, statistics, etc., in addition to malaria surveillance.

In Colombia, the "Dirección de Campañas Directas" is responsible for both the malaria eradication and Aedes aegypti eradication campaigns. In addition it undertakes yaws, leprosy, smallpox and poliomyelitis activities. In this program, activities are carried on in a coordinated manner with a view to making the most economical use of the resources available for reaching the rural population. Furthermore, 50 health promoters were trained to take blood slides for malaria surveillance. An agreement was signed between the NMES and the Department of Health of the Valle del Cauca. Training activities consisted of a number of meetings for professional and auxiliary personnel.

In Cuba, malaria surveillance is the responsibility of the general health services, since the entire country is in the maintenance phase. The National Epidemiological Program, with its vector control service, is responsible for the elimination of any potential or active focus that appears.

In Ecuador malaria surveillance was included in the program of the training course for 43 nursing auxiliaries.

In Peru, in areas that have reached the maintenance phase, surveillance has been entrusted to the general health services. The malaria campaign staff was transferred to the general services and trained for other activities. In 1970, integration was extended to the Departments of Cuzco, Madre de Dios, Apurimac and Puno, when these were shifted into the maintenance phase. To provide the staff of the general health services with a better background for malaria surveillance, short courses were held for 46 physicians, 40 nursing auxiliaries, and 20 laboratory technicians. For 1971, the training program includes meetings and seminars at national, zone, and local level, which will make possible for the staff of health services to take an active part in malaria surveillance in all areas in the maintenance phase.

E. Budget

Table No. 19 shows national outlays for malaria eradication in 1969 and in 1970 as well as the budget estimates for 1971, by country. It does not include outlays for malaria surveillance in those countries that have reached the maintenance phase, where those activities are completely integrated into the general health services. The table shows separately internal financing, and funds obtained as loans under bilateral agreements. It is to be noted that the estimated budget for 1970 from all sources of funds, increased by \$5,112,000 or 11.5 per cent of the funds used in 1969, which is indicative of the priority assigned by the Governments of the Americas to malaria eradication. The largest part of the increase is accounted for by Mexico, where the program expanded its coverage towards the end of the year.

Internal financing was supplemented by loans from USAID to nine countries in the amount of \$6,455,000, and by grants from the same agency to one country in the amount of \$1,270,000. The financial support of this agency amounted to 15.5 per cent of the total funds used during the period, primarily for operations in the attack and consolidation phases.

In 1971, provision is made for an increase in internal financing in the order of 6.2 million dollars over 1970 and more than 11 million dollars over the amounts spent by the Governments in 1969.

Graph No.3 shows the contributions of the Governments and the agencies contributing resources to the malaria eradication program in the Americas.

Table No. 20 shows expenditures in 1970 and the estimated budgetary requirements for PAHO/WHO assistance to the countries from 1971 to 1973.

Table 19

NATIONAL EXPENDITURES 1968-1970 AND BUDGET 1971
FOR MALARIA ERADICATION IN THE AMERICAS

(In thousands of U. S. dollars)

Country	National expenditures 1969	Estimated National Expenditures 1970			Estimated National Budget 1971		
		Internal financing	Loans AID	Total	Internal financing	Loans AID	Total
Argentina	913	275 ^{a)}	-	275 ^{a)}	...	...	...
Bolivia	282	313	-	313	340	-	340
Brazil	13 603 ^{b)}	11 446	2 569	14 015	14 853	3 141	17 994
Colombia	3 834 ^{c)}	3 742	-	3 742	4 186	-	4 186
Costa Rica	628 ^{d)}	401	270	671	553	210 ^{e)}	763
Cuba .....	...	...	...	...	...	...	...
Dominican Republic ..	782	782	-	782	782	-	782
Ecuador	1 050 ^{f)}	711	404	1 115	687	93 ^{g)}	780
El Salvador	1 565 ^{h)}	791	478	1 269	944	300	1 244
Guatemala	1 521 ⁱ⁾	1 122	485	1 607	1 629	-	1 629
Guyana	102	110	-	110	110	-	110
Haiti	1 135 ^{j)}	35	1 270 ^{k)}	1 305	35	-	35
Honduras	1 072 ^{l)}	740	502	1 242	750	-	750
Jamaica	431 ^{m)}	300 ^{m)}	-	300 ^{m)}	455 ^{m)}	-	455 ^{m)}
Mexico	6 628	11 095	-	11 095	12 651	-	12 651
Nicaragua	1 911 ⁿ⁾	737	696	1 433	1 067	393	1 460
Panama	917 ^{o)}	696	613	1 309	738	727	1 465
Paraguay	903 ^{p)}	475	438	913	542	450	992
Peru	859	1 137	-	1 137	1 222	-	1 222
Trinidad and Tobago	450	566	-	566	547	-	547
Venezuela	5 069	5 605	-	5 605	5 229	-	5 229
British Honduras	47	47	-	47	43	-	43
French Guiana	292 ^{q)}	244 ^{q)}	-	244 ^{q)}	273 ^{q)}	-	273 ^{q)}
Surinam	313	324	-	324	318	-	318
Total	44 307 ^{r)}	41 694	7 725	49 419	47 954	5 314	53 268

... No information.

- a) Does not include personnel salaries. b) Includes \$2 237 000 from AID Loan. c) Includes 215 000 from AID Loan. d) Includes \$235 000 from AID Loan. e) Loan in negotiation. f) Includes \$404 000 from AID Loan. g) Includes \$12 000 from previous loan, and \$81 000 in negotiation. h) Includes \$697 000 from AID Loan. i) Includes \$518 000 from AID Loan. j) Includes \$1 100 000 from AID Grant. k) AID Grant. l) Includes \$682 000 from AID Loan. m) Includes general mosquito control program. n) Includes \$1 270 000 from AID Loan. o) Includes \$222 000 from AID Loan. p) Includes \$521 000 from AID Loan. q) Including Malaria and *A. aegypti* campaigns. r) Represents \$36 206 000 direct allocations by Governments and \$8 101 000 in Loan and Grant funds.

Graph 3

MALARIA ERADICATION IN THE AMERICAS EXPENDITURES,
1957-1970

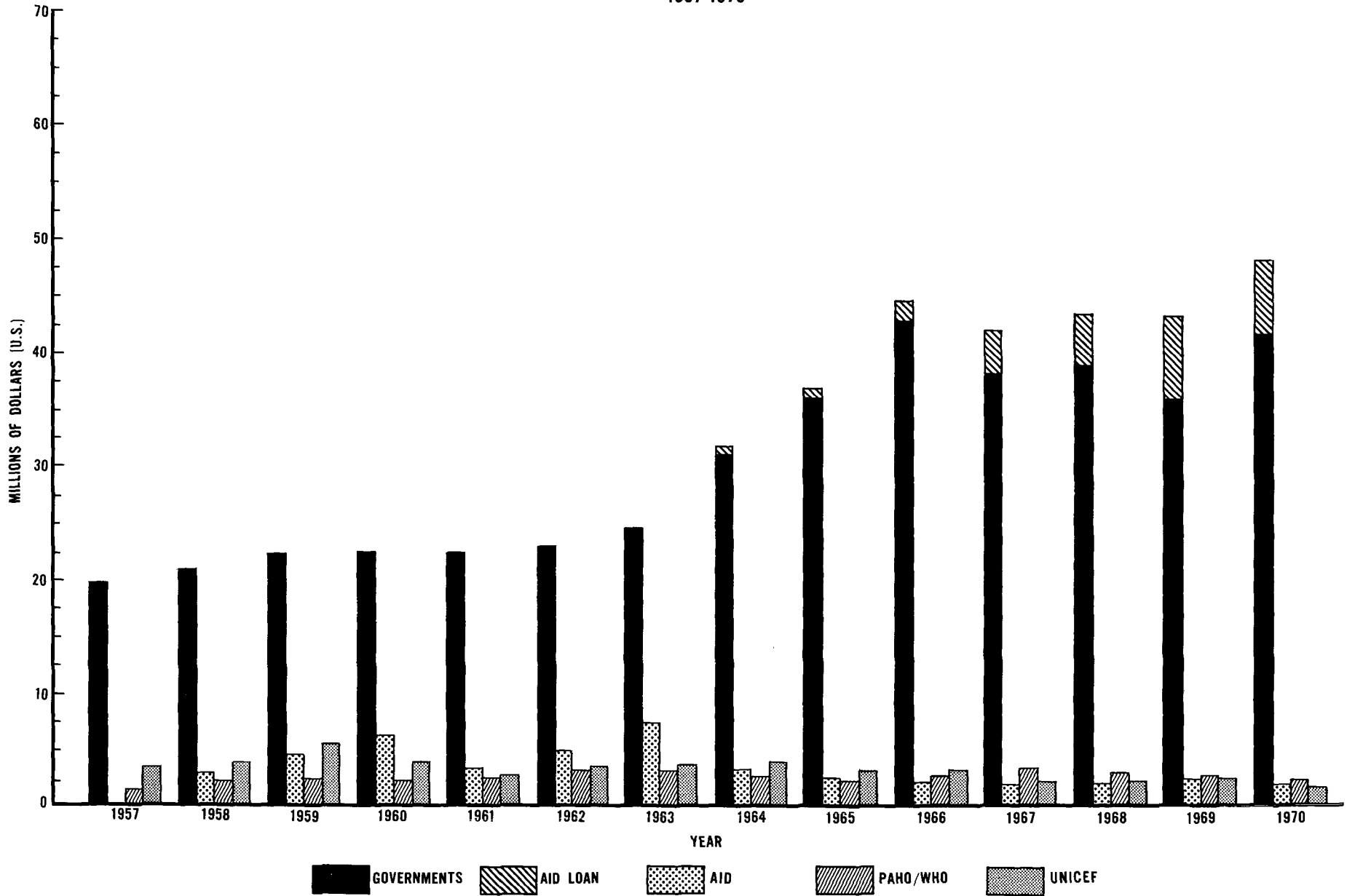


Table 20

ESTIMATED REQUIREMENTS FOR MALARIA ERADICATION PROGRAMS
IN THE AMERICAS^{a)}

	1970 ^{b)}	1971 ^{c)}	1972 ^{c)}	1973 ^{c)}
TOTAL COST	50 976 065	56 013 410	54 825 959	53 501 724
GOV. AND OTHER SOURCES	48 553 388	53 530 124	52 557 324	51 376 125
PAHO/WHO PORTION:				
Personnel costs and travel..	1 981 191	1 970 232	1 809 535	1 666 579
Supplies and equipment	369 771	407 974	358 600	365 720
Fellowships	23 213	26 600	23 800	12 600
Grants and others	48 502	78 480	76 700	80 700
SUB-TOTAL PAHO/WHO	2 422 677	2 483 286	2 268 635	2 125 599

SOURCES OF PAHO/WHO FUNDINGS

SOURCE	1970 ^{b)}	1971 ^{c)}	1972 ^{c)}	1973 ^{c)}
PAHO-Reg.	860 124	1 540 689	1 380 887	1 197 756
PAHO-SMF	699 976	313 091	200 000	-
WHO-M	798 078	514 625	578 848	825 543
WHO-TA	64 499	114 881	108 900	102 300
TOTAL	2 422 677	2 483 286	2 268 635	2 125 599

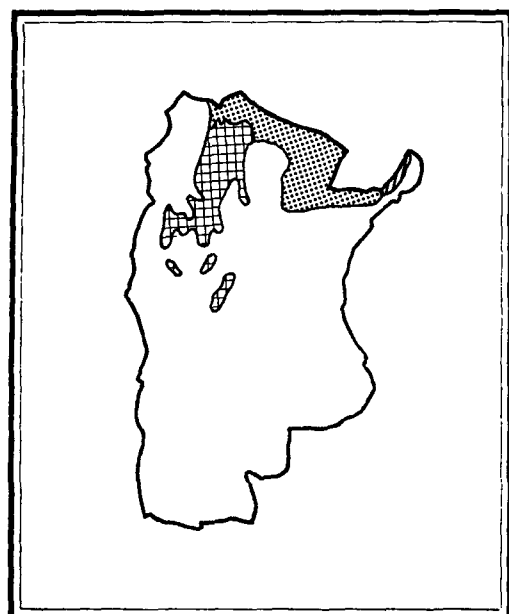
PAHO/WHO PERSONNEL

CATEGORY	1970	1971	1972	1973
Medical Officer	34	33	32	28
Sanitary Engineer	10	10	9	7
Entomologist	7	7	6	6
Parasitologist	2	2	2	2
Epidemiologist	1	2	2	2
Economist	1	1	1	1
Statistician	1	1	1	1
Adm. Methods Officer	4	3	2	2
Assistant Engineer	1	1	1	1
Laboratory Adviser	1	1	1	1
Sanitary Inspector	28	22	11	8
Other	15	15	14	14
TOTAL	105	98	82	73

- a) Figures shown include all malaria eradication projects, AMRO projects, supporting personnel in Zone Offices and Malaria Eradication Department.
b) Expenditures.
c) Estimated requirements.

ARGENTINA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>23 413</u>	<u>4 024 458</u>
Non malarious areas	<u>20 570</u>	<u>3 675 407</u>
Originally malarious areas		
Maintenance phase	<u>1 585</u>	<u>111 661</u>
Consolidation phase	<u>1 183</u>	<u>235 690</u>
Attack phase	<u>75</u>	<u>1 700</u>
Total originally malarious areas	<u>2 843</u>	<u>349 051</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	60	62
Evaluation operations	3	220	223
Administrative and other	-	67	67
Transport	-	59	59
Total	5	406	411

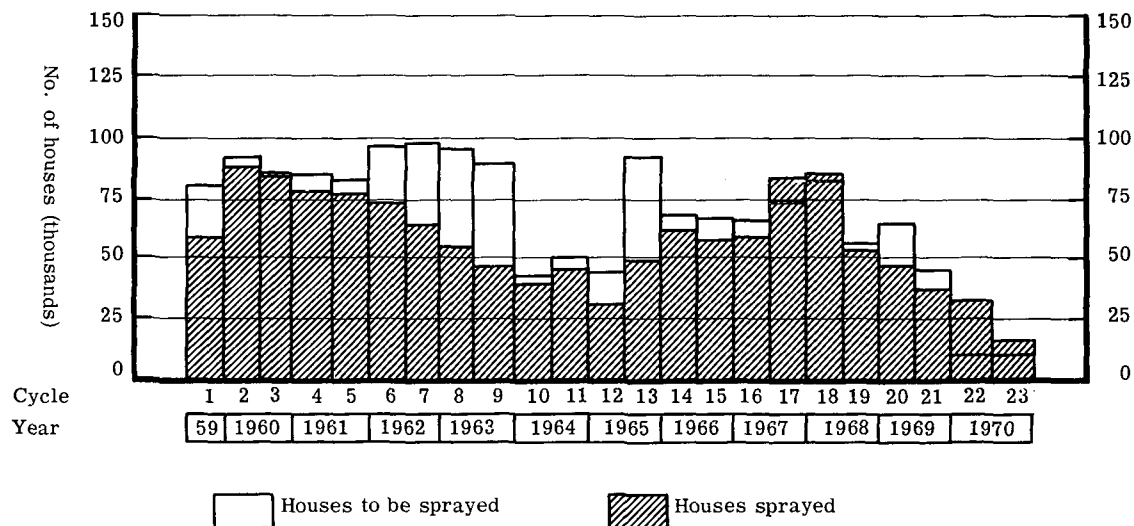
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	151	151
Two-wheel vehicles	-	-	45	45
Boats	-	-	4	4
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	200	200

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Aug. 59-Jun. 60	1st	81 619	57 995 ^{a)}	288 768	205 189	263	...
		2nd	92 438	88 079 ^{a)}	347 012	330 733	255	
2nd	Jul. 60-Jul. 61	3rd	84 011	84 929 ^{a)}	323 610	327 209	305	...
		4th	84 077	76 991 ^{a)}	308 142	282 178	334	
3rd	Aug. 61-Jun. 62	5th	81 906	75 734 ^{a)}	303 290	280 425	383	...
		6th	96 249	73 027	341 780	259 379	349	
4th	Jul. 62-Jun. 63	7th	97 908	63 967	351 098	229 432	353	...
		8th	95 552	54 742 ^{a)}	318 288	182 273	329	
5th	Jul. 63-Jun. 64	9th	90 333	46 627	317 972	164 420	320	...
		10th	43 572	39 430	135 574	122 685	324	
6th	Jul. 64-Jun. 65	11th	50 322	44 972	172 313	153 995	302	...
		12th	43 927	30 236	138 809	95 417	302	
7th	Jul. 65-Jun. 66	13th	90 224	48 428	327 495	175 788	416	21.1
		14th	66 853	60 220	217 492	195 913	366	
8th	Jul. 66-Jun. 67	15th	65 304	57 484	227 149	199 949	403	12.0
		16th	65 340	58 707	228 690	205 885	462	
9th	Jul. 67-Jun. 68	17th	72 836	83 306	...	292 874	473	21.5
		18th	82 490	83 866	412 000	290 444	481	
10th	Jul. 68-Jun. 69	19th	55 730	54 382	278 000	194 479	454	23.3
		20th	64 705	46 404	207 060	160 922	468	
11th	Jul. 69-Jun. 70	21st	45 571	38 355	157 190	137 817	479	...
		22nd	9 606	33 385 ^{b)}	36 424	116 440 ^{b)}	407	
12th	Jul. 70-Dec. 70	23rd	9 606	16 615 ^{b)}	36 424	64 071 ^{b)}	401	9.7

a) Some houses were sprayed once a year. b) Includes houses sprayed in consolidation phase areas.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1959a)	12 377	1 043	8.4	-	1 043	-
1960	82 191	2 013	2.4	7	2 006	-
1961	93 464	4 524	4.8	4	4 520	-
1962	112 477	4 685	4.2	-	4 685	-
1963	96 668	834	0.9	-	834	-
1964	102 683	543	0.5	-	543	-
1965	57 872	213	0.4	-	211	2
1966	89 065	300	0.3	-	300	-
1967	111 917	1 512	1.4	-	1 511	1
1968	61 601	418	0.7	-	418	-
1969	40 027	69	0.2	-	69	-
1970	7 979	9	0.1	-	9	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1959 ^{a)}	911	9 491 ^{a)}	2.5	51	-	-	-	32	-	19	-	-	51	-
1960 ^{b)}	929	14 438	1.5	26	-	-	-	14	-	12	-	-	26	-
1961 ^{b)}	1 278	44 595	3.5	17	-	2	-	5	-	10	-	-	17	-
1962 ^{b)}	1 542	39 675	2.6	23	-	10	-	5	1	7	-	-	20	3
1963 ^{b)}	1 584	60 742	3.8	11	2	-	-	6	2	-	1	-	9	2
1964 ^{c)}	1 648	41 926 ^{c)}	5.1	10	1	-	-	7	-	2	-	-	10	-
	627	24 415	7.8	1	1	-	-	-	-	-	-	-	1	-
1965	449	92 658	20.6	41	20	-	1	8	3	7	2	-	38	3
1966	454	71 346	15.7	56	27	1	1	26	1	-	-	-	56	-
1967	387	82 208	21.2	53	41	1	5	1	-	-	5 ^{d)}	1	52	-
1968	423	75 300	17.8	126	101	-	8	6	-	-	11	-	126	-
1969	432	41 693	9.7	165	136	16	5	-	-	2	6	-	165	-
1970	1 183	47 206	4.0	70	33	3	13	1	-	2	18	-	70	-

a) August-December. b) Including maintenance phase area. c) First semester includes maintenance phase. d) Includes one cryptic case.

ARGENTINA (Cont.)

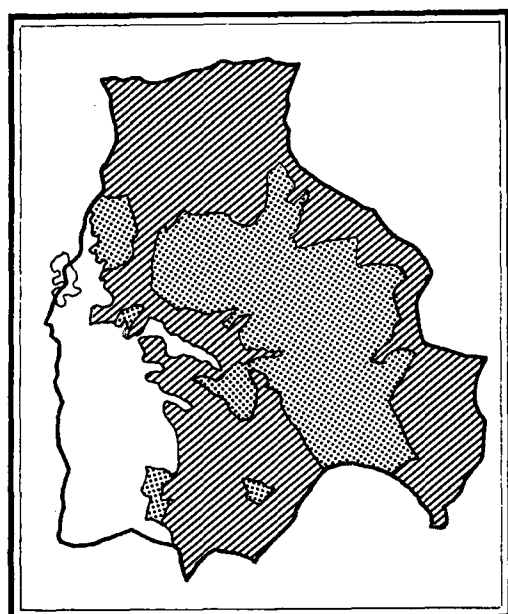
MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1964 ^{a)}	1 021	12 698 ^{a)}	2.5	-	-	-	-	-	-	-	-	-	-	-	-
1965	1 356	32 351	2.4	-	-	-	-	-	-	-	-	-	-	-	-
1966	1 381	50 870	3.7	55	40	4	1	7	2	1	-	-	53	2	-
1967	1 477	65 210	4.4	55	49	1	1	1	2	-	1 ^{b)}	-	54	1	-
1968	1 631	103 958	6.4	35	27	-	-	7	-	-	1	-	35	-	-
1969	1 648	77 458	4.7	13	1	-	1	3	-	7	1	-	13	-	-
1970	1 585	40 225	2.5	7	-	-	1	2	-	2	2	-	7	-	-

a) July-December. b) Cryptic case.

BOLIVIA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>4 943</u>	<u>1 098 581</u>
Non malarious areas	<u>3 143</u>	<u>277 235</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>1 398</u>	<u>698 040</u>
Attack phase	<u>411</u>	<u>123 306</u>
Total originally malarious areas	<u>1 800</u>	<u>821 346</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	49 (81)	49 (81)
Evaluation operations	9	121	130
Administrative and other	-	30	30
Transport	-	45	45
Total	9	245 (81)	254 (81)

TRANSPORT FACILITIES

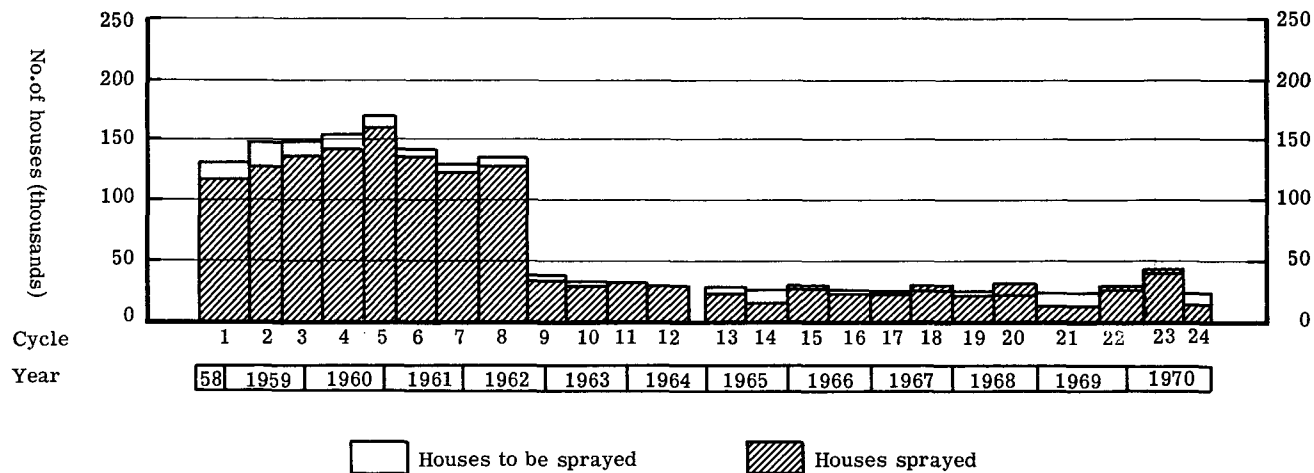
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	10	36	13	59
Two-wheel vehicles	-	47	31	78
Boats	14	16	3	33
Animals	29	66	-	95
Other	24	24	24	72
Total	77	189	71	337

(Part-time personnel in parentheses)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Sep. 58-Aug. 59	1st	131 444	116 572	1st	6 365	10 910	627 362	556 190	362	115	8.3
		2nd	148 200	129 119				691 820	627 210	331		7.0
2nd	Sep. 59-Aug. 60	3rd	147 263	136 601	2nd	11 331	12 268	695 521	634 859	319	118	7.6
		4th	153 514	142 536				692 274	660 185	309		7.2
3rd	Sep. 60-Aug. 61	5th	169 690	159 952	-	-	-	742 902	700 295	331	-	7.6
		6th	142 210	134 173				612 356	577 743	329		7.5
4th	Sep. 61-Sep. 62	7th	129 600	124 623	-	-	-	546 005	524 986	353	-	7.9
		8th	135 474	128 898				551 785	525 005	359		8.6
5th	Oct. 62-Sep. 63	9th	32 561	34 469	-	-	-	124 643	131 962	408	-	6.0
		10th	32 361	28 893				110 578	98 727	428		5.9
6th	Oct. 63-Sep. 64	11th	32 361	32 160	-	-	-	123 923	123 152	533	-	5.3
		12th	28 536	27 509				101 503	97 855	547		5.6
7th	Jan. 65-Dec. 65	13th	26 941	24 634	-	-	-	96 020	87 799	557	-	5.3
		14th	26 941	16 357				94 987	57 671	575		4.1
8th	Jan. 66-Dec. 66	15th	27 130	29 752	-	-	-	97 375	106 787	588	-	4.7
		16th	27 130	23 839				100 023	87 890	617		4.6
9th	Jan. 67-Dec. 67	17th	24 161	24 733 ^{a)}	-	-	-	86 980	82 565 ^{a)}	654	-	4.9
		18th	24 992	30 254 ^{a)}				89 971	90 813 ^{a)}	584		4.5
10th	Jan. 68-Dec. 68	19th	24 156	20 861 ^{a)}	-	-	-	80 075	79 631 ^{a)}	543	-	6.1
		20th	21 387	32 353 ^{a)}				70 897	95 240 ^{a)}	609		4.7
11th	Jan. 69- Feb. 70	21st	23 886	14 715 ^{a)}	-	-	-	84 112	55 933 ^{a)}	513	-	7.4
		22nd	28 189	32 220 ^{a)}				100 137	124 712	478		7.1
12th	Mar.70-Dec. 70	23rd	42 220	43 233	-	-	7 502 ^{b)}	151 351	155 993	571	-	6.4
		24th	24 178	16 187				100 348	65 657	572		6.0

a) Includes emergency sprayings. b) Houses sprayed with DDT once a year.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958a)	3 426	257	7.5	53	143	61
1959	83 762	1 970	2.4	243	1 419	308
1960	87 775	893	1.0	143	621	129
1961	141 033	782	0.6	58	711	13
1962	159 397	1 089	0.7	378	700	11
1963	117 432	2 241	1.9	906	1 335	-
1964	89 333	3 002	3.4	477	2 525	-
1965	150 800	845	0.6	136	709	-
1966	133 735	1 005	0.8	188	817	-
1967	113 500	811	0.7	95	716	-
1968	97 996	1 170	1.2	288	882	-
1969	133 274	3 360	2.5	787	2 573	-
1970	135 262	5 603	4.1	646	4 957	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1961	461	11 975	2.6	14	1	1	5	7	-	-	-	-	14	-
1962 ^{b)}	759	18 131 ^{b)}	3.2	21	-	-	2	19	-	-	-	-	21	-
1963 ^{b)}	1 179	58 587 ^{b)}	7.4	104	18	1	-	73	-	2	10	4	100	-
1964	1 141	66 207	5.8	452	154	7	5	21	-	-	265	20	430	2
1965	1 173	119 954	10.2	96	50	-	8	22	-	-	16	2	92	2
1966	1 202	126 410	10.5	368	209	11	-	59	-	-	89	26	342	-
1967	1 214	101 037	8.3	631	269	1	4	26	-	-	331 ^{c)}	105	526	-
1968	1 245	89 639	7.2	828	499	13	7	52	-	-	257	184	644	-
1969	1 174	52 025	4.4	1 065	465	13	4	36	-	-	547	104	961	-
1970	1 389	32 003	2.3	1 259	265	1	4	25	-	-	964	5	1 254	-

a) September-December. b) January-September. c) Includes 1 congenital case.

BRAZIL

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>93 870</u>	<u>8 511 965</u>
Non malarious areas	<u>56 856</u>	<u>1 626 252</u>
Originally malarious areas		
Maintenance phase	<u>830</u>	<u>1 056</u>
Consolidation phase	<u>13 780</u>	<u>193 530</u>
Attack phase	<u>22 404</u>	<u>6 691 127</u>
Total originally malarious areas	<u>37 014</u>	<u>6 885 713</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	53	7 329	7 382
Evaluation operations	88	4 069	4 157
Administrative and other	5	463	468
Transport	-	986	986
Total	146	12 847	12 993

TRANSPORT FACILITIES^{a)}

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	1 400	1 400
Two-wheel vehicles	-	-	797	797
Boats	-	-	502	502
Animals	-	-	2 334	2 334
Other	-	-	5	5
Total	-	-	5 038	5 038

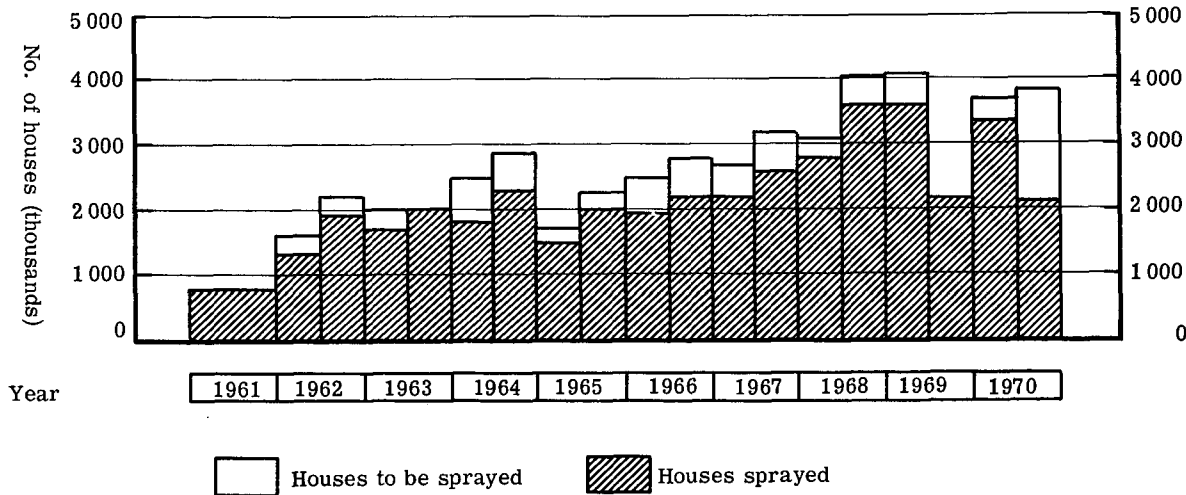
a) Transport facilities are used in epidemiological evaluation and spraying operations activities.

BRAZIL (Excl. São Paulo) (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
(a)	Jan. 61-Nov. 61	(a)	820 095	814 475 ^{b)}	3 399 300 ^{c)}	3 380 000 ^{c)}	...	...
(a)	Jan. 62-Jun. 62	...	1 622 052	1 350 566	7 016 997	5 843 075	424	...
	Jul. 62-Dec. 62	...	2 292 000	1 960 358	9 724 956	8 317 433	420	...
(a)	Jan. 63-Jun. 63	...	2 062 265	1 726 289	8 574 898	7 178 751	407	...
	Jul. 63-Dec. 63	...	2 045 534	2 010 035	8 524 558	8 376 676	414	7.5
(a)	Jan. 64-Jun. 64	...	2 532 153	1 899 065	10 502 357	7 876 719	412	7.9
	Jul. 64-Dec. 64	...	2 993 954	2 350 055	12 310 241	9 662 834	419	7.7
(a)	Jan. 65-Jun. 65	...	1 799 354	1 588 551	7 361 157	6 498 902	414	7.7
	Jul. 65-Dec. 65	...	2 388 893	2 092 159	9 364 460	8 201 391	413	7.6
(a)	Jan. 66-Jun. 66	...	2 556 302	1 925 160	9 829 492	7 402 633	408	7.8
	Jul. 66-Dec. 66	...	2 800 000	2 241 208	10 900 000	8 724 032	389	7.4
(a)	Jan. 67-Jun. 67	...	2 741 666	2 276 072	10 323 308 ^{c)}	8 833 213	421	7.7
	Jul. 67-Dec. 67	...	3 244 299	2 673 073	12 328 336 ^{c)}	10 459 348	447	7.4
(a)	Jan. 68-Jun. 68	...	3 187 958	2 820 339	12 434 919	10 931 796	439	7.5
	Jul. 68-Dec. 68	...	4 077 323	3 682 956	15 899 767	14 721 063	453	7.3
(a)	Jan. 69-Jun. 69	...	4 079 989	3 601 762	...	14 279 724	438	7.6
	Jul. 69-Dec. 69	...	2 222 487	2 266 725	...	8 906 772	437	7.7
(a)	Feb. 70-Jun. 70	...	3 795 372	3 466 314	15 196 516	13 583 020	420	7.5
	Jul. 70-Dic. 70	...	3 837 845	2 120 139	15 363 852	8 188 955	430	7.5

a) Owing to different spray cycle timing in different regions, these data refer to the calendar year. b) Sprayings. c) Estimated.



BRAZIL (Excl. São Paulo) (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1961	230 205	36 912 ^{a)}	16. 03	3 620	32 285	2
1962	513 767	68 371	13. 31	22 683	45 683	5
1963	860 681	109 210	12. 69	37 502	71 610	98
1964	1 241 242	109 507	8. 82	41 737	67 713	57
1965	1 549 679	108 687	7. 01	51 007	57 573	107
1966 ^{b)}	1 493 309	106 655	7. 14	57 349	49 060	246
1967	1 516 120	100 919	6. 65	56 681	44 014	224
1968 ^{c)}	1 336 101	79 154	5. 92	43 232	35 687	235
1969	1 390 046	55 799	4. 01	30 866	24 785	148
1970	1 059 955	53 261	5. 02	27 994	25 116	151

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1965	1 439	132 231	9. 2	70	1	1	-	60	-	-	8	14	56	-
1966 ^{d)}	2 541	162 102 ^{d)}	8. 5	228	54	7	-	98	-	-	69	34	194	-
1967	6 000	426 185	7. 1	586	171	65	-	157	3	4	186	209	377	-
1968	5 926	537 347	9. 1	1 148	261	11	4	542	3	17	310	591	556	1
1969	6 380	554 881	8. 7	252	63	2	-	60	2	-	125	100	150	2
1970	7 915	505 319	6. 4	147	30	5	-	75	2	1	34	52	94	1

MAINTENANCE PHASE AREAS

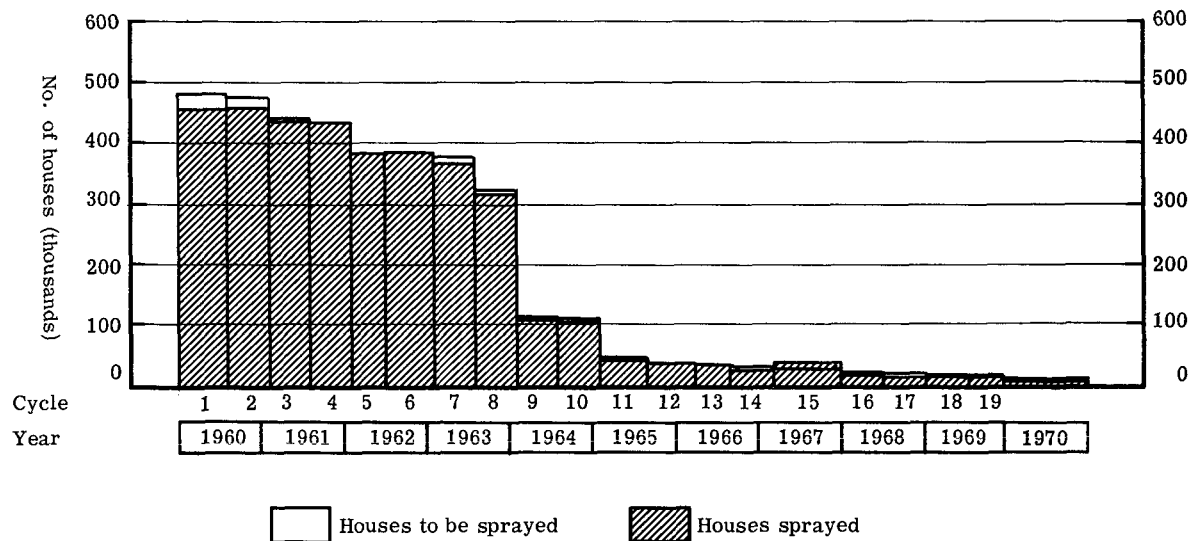
1966 ^{d)}	733	22 161 ^{d)}	4. 0	7	-	-	-	7	-	-	-	3	3	1
1967	756	23 588	3. 1	9	1	-	-	8	-	-	-	2	7	-
1968 ^{c)}	780	19 690	2. 5	10	-	-	-	10	-	-	-	-	10	-
1969	804	21 495	2. 7	5	-	-	-	4	-	-	1 ^{e)}	1	4	-
1970	830	21 287	2. 6	8	-	-	-	8	-	-	-	4	4	-

a) Includes 1 005 undifferentiated mixed infections from Espírito Santo Sector. b) Includes 4th quarter for areas in consolidation and maintenance phases. c) Data for last 2 months not separated by phase. d) January-September. e) Criptic case.

BRAZIL (São Paulo) (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 60-Jan. 61	1st	481 533	455 219	2 002 214	1 892 679	433	8.4
		2nd	475 121	458 926	1 992 182	1 924 405	404	9.8
2nd	Feb. 61-Jan. 62	3rd	441 104	436 048	1 870 722	1 849 398	416	9.4
		4th	436 057	431 473	1 807 892	1 789 051	412	9.7
3rd	Feb. 62-Jan. 63	5th	381 254	380 623	1 605 079	1 602 444	419	9.7
		6th	385 555	383 717	1 558 413	1 550 975	420	9.8
4th	Feb. 63-Jan. 64	7th	378 922	366 817	1 525 540	1 477 021	424	9.7
		8th	324 556	316 221	1 346 907	1 312 405	433	9.5
5th	Feb. 64-Jan. 65	9th	113 293	110 114	379 362	368 721	444	8.1
		10th	113 257	109 480	449 981	434 974	440	8.3
6th	Feb. 65-Mar. 66	11th	43 711	43 313	171 413	169 855	436	8.3
		12th	36 050	35 766	139 550	138 459	412	7.8
7th	Mar. 66-Jan. 67	13th	35 646	33 407	134 850	126 375	405	8.1
		14th	32 523	29 923	123 424	114 484	393	7.8
8th	Jul. 66-Jun. 67	15th	32 450	42 379	123 310	142 370	388	8.6
		16th	22 252	23 910	...	170 314	426	8.5
9th	Feb. 67-Dec. 67	17th	22 252	18 292	...	77 154	401	9.3
		18th	22 522	20 628	86 000	67 973	441	8.0
10th	Jan. 68-Jun. 68	19th	22 246	18 628	80 000	62 515	408	8.8
		20th	19 757	17 731	64 000	59 550	395	8.7
11th	Aug. 69-Jun. 70	21th	19 187	16 468	64 276	53 159	381	8.8
	Jul. 70-Dec. 70							



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1960	114 622	8 297	7.2	66	8 230	1
1961	208 502	7 276	3.5	258	7 015	3
1962 ^{a)}	370 667	3 689	1.0	227	3 459	3
1963 ^{a)}	384 993	2 207	0.6	427	1 778	2
1964	227 608	1 295	0.6	235	1 060	-
1965	52 554	858	1.6	140	717	1
1966	37 502	758	2.0	108	650	-
1967	90 194	1 067	1.2	269	796	2
1968	65 264	434	0.7	205	229	-
1969	35 064	374	1.1	169	204	1
1970	239 691	815	0.3	341	474	-

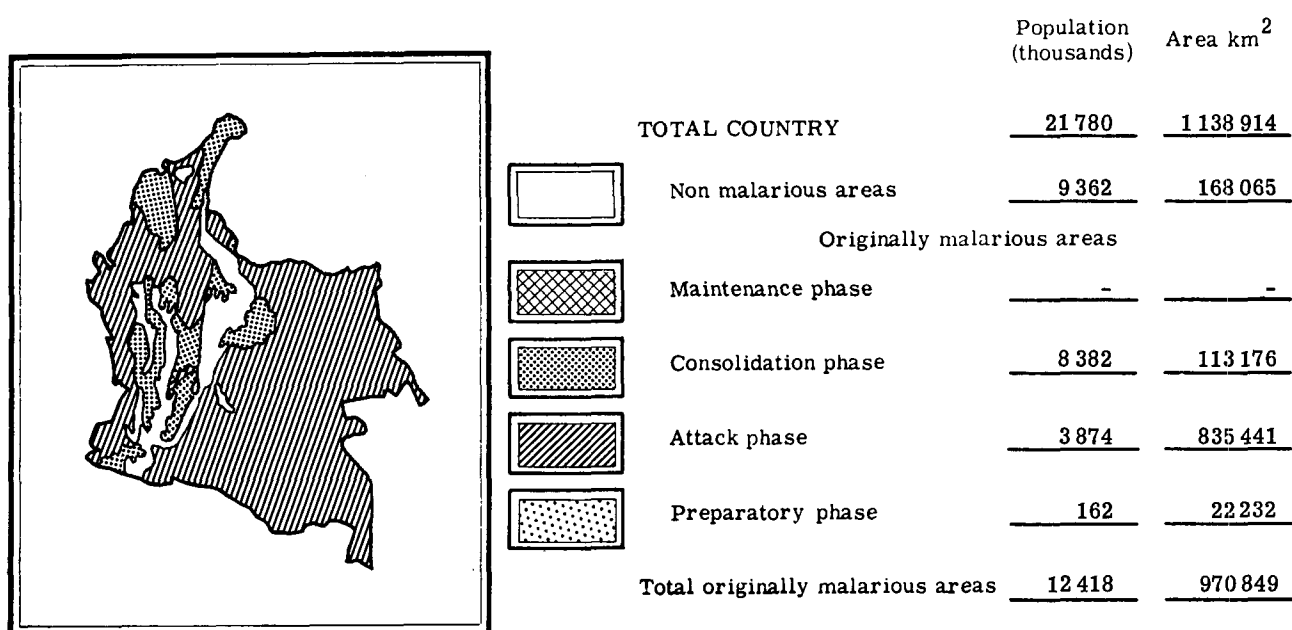
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1964	2 183	307 014	14.1	476	21	15	-	402	-	9	29	69	407	-
1965	3 766	140 491	3.7	691	29	3	-	599	6	10	44	112	579	-
1966	3 974	139 865	3.5	982	295	9	2	622	2	5	47	234	747	1
1967	5 152	95 383	1.9	261	43	1	-	199	2	13	3	105	154	2
1968	5 152 ^{b)}	123 277	2.4	578	99	1	4	426	1	1	46	261	317	-
1969	5 758	138 399	2.4	521	100	-	-	376	2	16	27	210	311	-
1970	5 865	204 207	3.5	413	28	2	-	288	1	3	91	166	247	-

a) Data for entire State, not separated by attack or consolidation phase. b) 1967 population.

COLOMBIA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	11	1 227	1 238
Evaluation operations	19	1 099	1 118
Administrative and other	3	249	252
Transport	-	432	432
Total	33	3 007	3 040

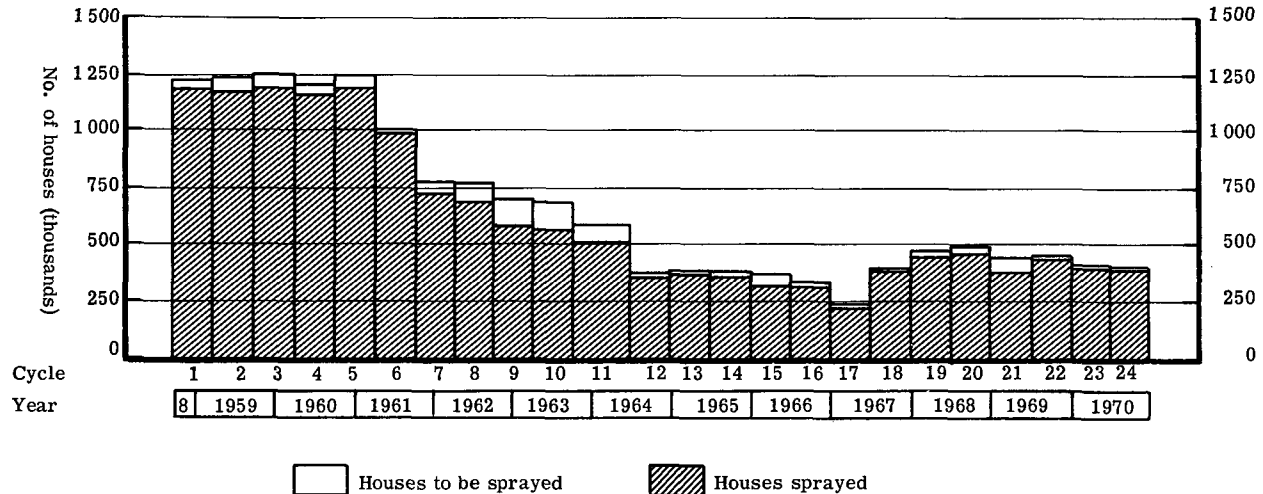
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	100	66	151	317
Two-wheel vehicles	1	146	32	179
Boats	95	138	48	281
Animals	709	817	32	1 558
Other	-	-	-	-
Total	905	1 167	263	2 335

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Oct. 58-Sep. 59	1st	1 235 473	1 181 235	6 900 118	6 597 002	466	6.6
		2nd	1 240 810	1 176 392	6 848 030	6 492 119	425	8.9
2nd	Oct. 59-Sep. 60	3rd	1 273 295	1 196 930	6 915 265	6 500 325	409	9.4
		4th	1 228 550	1 162 059	6 556 771	6 201 358	309	8.7
3rd	Oct. 60-Sep. 61	5th	1 253 594	1 181 557	6 642 794	6 261 680	394	9.7
		6th	1 050 556	945 501a)	5 320 016	4 788 305	402	9.3
4th	Oct. 61-Sep. 62	7th	796 056	738 459a)	3 997 793	3 708 400	408	8.9
		8th	789 399	693 315a)	3 928 049	3 449 630	421	8.8
5th	Oct. 62-Sep. 63	9th	701 762	586 740b)	3 440 739	2 876 514	435	8.4
		10th	690 726	576 540b)	3 363 145	2 806 950	459	7.9
6th	Oct. 63-Dec.64	11th	582 580	508 501b)	2 801 627	2 445 856	437	7.9
		12th	365 843	362 793	1 710 645	1 696 396	602	6.0
7th	Jan. 65-Dec.65	13th	376 662	373 763	1 746 130	1 732 717	630	5.8
		14th	378 869	370 239	1 762 953	1 722 802	589	5.8
8th	Jan. 66-Dec.66	15th	375 005	339 962	1 705 523	1 546 160	572	5.3
		16th	342 605	337 266	1 577 353	1 552 673	590	5.4
9th	Jan. 67-Dec.67	17th	343 363	340 212	1 545 133	1 543 350	595	5.3
		18th	409 174	401 683	1 923 118	1 895 349	534	5.3
10th	Jan. 68-Dec.68	19th	484 075	449 431	2 294 006	2 120 499	567	5.4
		20th	502 051	467 461c)	2 375 849	2 285 575	455	5.3
11th	Jan. 69-Dec.69	21st	463 187	397 427d)	2 141 790	1 813 709	529	5.5
		22nd	464 692	451 315d)	2 146 877	2 098 882	532	5.5
12th	Jan. 70-Dec.70	23rd	427 433	415 506e)	1 901 090	1 924 380	518	5.8
		24th	426 724	404 638e)	1 889 861	1 864 001	522	5.6

a) Some houses were sprayed in annual cycles. b) Some houses were sprayed in cycles of one, three and four times a year. c) Beginning September some houses were sprayed with 1 g. per m². d) In addition, 82 377 houses were sprayed in quarterly cycles and 34 988 houses in consolidation phase. e) In addition 73 752 houses were sprayed in quarterly cycles and 28 853 in annual cycles.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1959	329 288	4 172	1.3	1 195	2 942	35
1960	509 920	8 426	1.6	3 758	4 642	26
1961	570 160	16 974	3.0	10 235	6 694	45
1962	626 995	17 350	2.8	9 619	7 697	34
1963	456 592	17 448	3.8	9 113	8 311	24
1964	321 115	13 515	4.2	8 070	5 423	22
1965	174 664	14 729	8.4	9 591	5 125	13
1966	293 472	17 538	6.0	10 392	7 135	11
1967	391 566	22 416	5.7	13 167	9 188	61
1968	477 495	24 869	5.2	14 798	10 050	21
1969	351 586	34 335	9.8	21 237	13 081	17
1970	310 339	27 387	8.8	15 680	11 690	17

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1962 ^{a)}	3 027	70 250 ^{a)}	3.1	147	48	4	-	72	5	-	18	99	48	-
1963	5 305	120 814	2.3	450	83	1	-	279	7	7	73	262	188	-
1964	6 053	178 408	3.0	1 214	224	-	1	774	-	27	188	578	635	1
1965	7 071	316 044	4.5	3 548	464	2	13	2 129	8	4	928	2 002	1 543	3
1966	8 193	362 425	4.4	4 597	1 007	3	23	2 477	3	22	1 062	2 120	2 475	2
1967	8 127	435 945	5.4	4 217	1 274	3	26	2 075	4	31	804	2 459	1 756	2
1968	7 803	381 362	4.9	2 464	419	5	22	1 609	2	14	393	1 166	1 294	4
1969	8 580	416 280	4.9	5 100	457	-	37	3 302	5	8	1 291	2 855	2 245	-
1970	8 382	375 073	4.5	4 885	478	9	70	2 921	5	4	1 398	2 295	2 590	-

a) April-December.

COSTA RICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>1 767</u>	<u>50 900</u>
Non malarious areas	<u>1 217</u>	<u>15 454</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>100</u>	<u>8 451</u>
Attack phase	<u>450</u>	<u>26 995</u>
Total originally malarious areas	<u>550</u>	<u>35 446</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	146	146
Evaluation operations	3	159	162
Administrative and other	4	43	47
Transport	-	22	22
Total	7	370	377

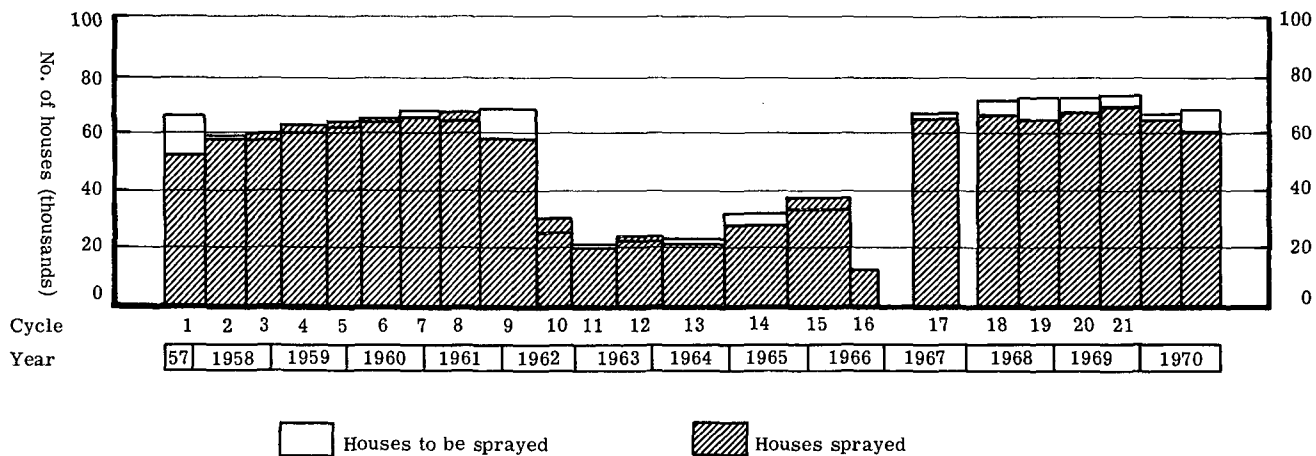
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	14	14	9	37
Two-wheel vehicles	-	132	-	132
Boats	4	26	-	30
Animals	9	35	-	44
Other	-	-	-	-
Total	27	207	9	243

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jul. 57-Aug. 58	1st	67 059	53 297	331 070	263 123	464	5.1
		2nd	58 641	58 624	287 634	287 537	419	7.4
2nd	Sep. 58-Sep. 59	3rd	58 858	60 800	282 930	292 856	465	6.9
		4th	60 413	63 063	290 405	303 151	531	7.1
3rd	Oct. 59-Sep. 60	5th	63 259	63 884	302 568	305 586	512	8.6
		6th	64 057	66 961	302 926	316 629	475	9.3
4th	Oct. 60-Sep. 61	7th	68 300	66 242	317 185	307 601	473	9.4
		8th	65 567	68 277	307 903	320 603	485	9.2
5th	Oct. 61-Dec. 62	9th	69 643	58 910	332 545	281 295	492	8.8
		10th	26 075	30 684	120 753	142 102	508	9.6
6th	Jan. 63-Feb. 64	11th	21 582	21 443	99 300	99 083	509	8.6
		12th	22 764	24 003	105 260	110 988	526	8.2
7th	Mar. 64-Oct. 65	13th	23 046	22 098	107 413	102 996	610	8.0
		14th	32 623	29 827a)	186 395	170 422	727	6.1
8th	Nov. 65-Nov. 66	15th	34 288	38 823b)	210 665	194 338	116c)	7.0
		16th ^{d)}	...	13 024e)	...	58 826	118c)	7.4
9th	Apr. 67-Nov. 67	17th	67 940	67 323	...	311 829	633	6.3
		(f)	...	10 640	...	48 812	594	7.3
10th	Jan. 68-Dec. 68	18th	72 549	66 751	340 980	327 111	546	5.5
		19th	73 229	65 867	361 972	325 927	542	5.4
11th	Jan. 69-Dec. 69	20th	73 537	68 123g)	366 279	344 390	560	6.8
		21st	74 725	69 299g)	374 106	350 340	554	6.4
12th	Jan. 70-Dec. 70	22nd	67 906	65 509g)	339 810	306 594	542	6.9
		23rd	69 624	62 835g)	342 324	305 819	557	6.9

a) In addition 3 573 houses were sprayed with dieldrin. b) With dieldrin; plus 5 660 emergency sprayings with dieldrin and 1 532 with DDT. c) Dieldrin. d) Operations suspended. e) With dieldrin; plus 1 396 emergency sprayings with DDT. f) Emergency sprayings. g) Does not include focal sprayings.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957	18 136	1 153	6.4	98	1 037	18
1958	36 801	2 139	5.8	151	1 981	7
1959	52 536	1 899	3.6	121	1 775	3
1960	67 643	2 000	3.0	64	1 936	-
1961	87 893	1 673	1.9	18	1 655	-
1962	131 058	1 482	1.1	5	1 476	1
1963	124 475	857	0.7	7	850	-
1964	47 940	566	1.2	-	566	-
1965	95 027	1 846	1.9	1	1 845	-
1966	121 696	2 594	2.1	1	2 593	-
1967	138 486	4 349	3.1	-	4 349	-
1968	115 889	1 156	1.0	-	1 156	-
1969	170 790	679	0.4	-	679	-
1970	161 847	324	0.2	4	319	1

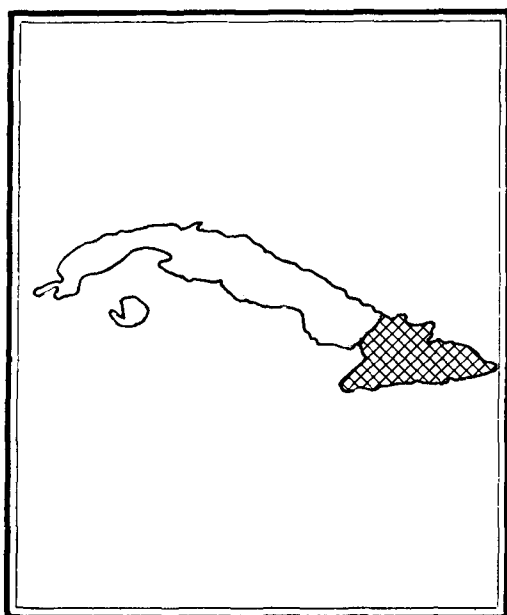
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 ^{a)}	230	52 594 ^{a)}	45.7	101	-	15	4	12	-	51	19	-	101	-
1963	255	133 375	52.3	371	244	45	-	7	-	10	65	-	371	-
1964	294	75 345	25.6	646	351	19	2	16	-	1	257	10	636	-
1965	263	102 724	39.1	717	196	3	-	4	-	2	512	3	714	-
1966	276	128 439	46.5	453	154	7	4	13	-	49	226	-	453	-
1967	151	25 623	17.0	94	41	-	-	16	-	-	37	-	94	-
1968	156	26 140	16.8	35	11	5	-	10	-	8	1	-	35	-
1969	87	31 572	36.3	9	1	1	3	1	-	-	3	-	9	-
1970	100	33 637	33.6	26	21	-	1	1	2	-	1	1	25	-

a) Started in July 1962.

CUBA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>8 553</u>	<u>110 422</u>
Non malarious areas	<u>6 544</u>	<u>74 621</u>
Originally malarious areas		
Maintenance phase	<u>3 009</u>	<u>35 801</u>
Consolidation phase	-	-
Attack phase	-	-
Total originally malarious areas	<u>3 009</u>	<u>35 801</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	225	225
Administrative and other	-	-	-
Transport	-	-	-
Total	-	225	225

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	80	80
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	80	80

CUBA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 62-Jan. 63	1st	391 155	385 020	2 007 000	1 975 528	210	9.7
	Jul. 62-Aug. 63	2nd	411 773	389 914	2 125 572	2 012 831	209	10.0
2nd	Mar. 63-Jul. 64	3rd	432 891	398 940	2 110 456	1 944 936	222	9.1
	Oct. 63-Mar. 65	4th	440 285	407 546	2 641 710	2 445 886	271	8.5
3rd	Apr. 64-Sep. 65	5th	454 923	423 361	2 283 531	2 125 145	248	9.1
	Oct. 64-Dec. 65	6th	460 484	431 349	2 289 065	2 127 888	238	9.2
4th	Apr. 65-Nov. 66	7th	467 312	438 527	2 315 390	2 172 753	240	8.9
	Oct. 65-Feb. 67	8th	417 596	320 363	2 084 221	1 569 778	245	8.9
5th	Apr. 66-Sep. 67	9th	194 000	165 865	747 372	812 739	239	8.4
	Jan. 67-Dec. 67	10th	...	34 949	...	246 334	220	8.5
6th	May. 67-Jul. 67	11th ^{a)}	...	8 378	...	37 051	223	6.6
	Nov. 67-Dec. 67	12th ^{a)}	...	2 191	...	10 171	225	8.2
7th	Jan. 68-Jul. 68	(b)	-	5 174	-	25 945	-	-
-	Jan. 69-Dec. 69	(b)	-	5 273	-	26 015	-	-

a) Cycle not yet finished. b) Focal sprayings.

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS a)

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1960 ^{b)}	28 791	1 325	4.6	197	1 128	-
1961 ^{b)}	91 181	3 230	3.5	128	3 102	-
1962	100 247	3 515	3.5	31	3 484	-
1963	126 334	833	0.7	6	827	-
1964	276 470	624	0.2	-	623	1
1965	423 790	131	0.03	-	131	-
1966 ^{c)}	465 199	27	0.01	1	26	-
1967	365 239	41	0.01	10	21	10

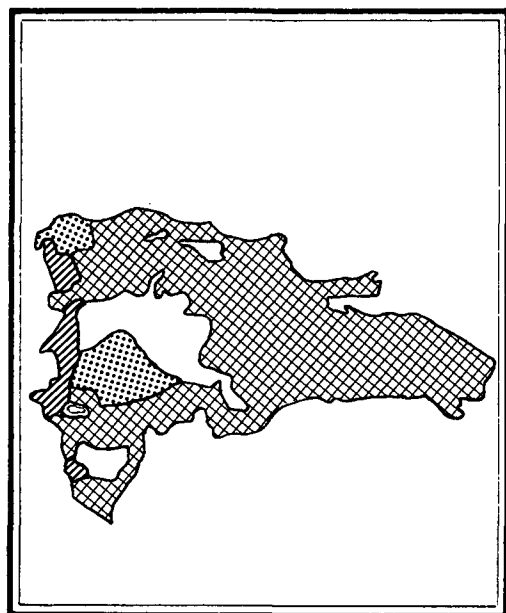
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1966 ^{d)}	5 488 ^{e)}	236 464 ^{d)}	5.2	9	3	-	5	1	-	-	-	4	4	1
1967	2 649	520 075	19.6	5	4	-	1	-	-	-	-	-	5	-
1968	2 734	834 107 ^{f)}	30.5	4 ^{f)}	-	-	4	-	-	-	-	-	4	-
1969	2 805	746 827 ^{g)}	26.6	3 ^{g)}	-	1	1	-	1	-	-	-	3	-
MAINTENANCE AND NON-MALARIOUS AREAS														
1970	2 857 ^{h)}	584 084	20.4	1	-	-	1	-	-	-	-	1	-	-

a) All areas previously in attack phase transferred to consolidation in 1968. b) Pre-eradication survey. c) Includes information for November and December for areas in consolidation phase. d) January-October. e) Including the non-malarious area and the area that passed into consolidation phase in September. f) Including 239 296 slides and four cases taken in non-malarious areas. g) Including 296 981 slides and three cases taken in non-malarious areas. h) Area previously in consolidation was passed to maintenance phase.

STATUS OF MALARIA PROGRAM AT DECEMBER 1970

DOMINICAN REPUBLIC



	Population (thousands)	Area km ²
TOTAL COUNTRY	4 011	48 442
Non malarious areas	28	880
Originally malarious areas		
Maintenance phase	3 593	38 046
Consolidation phase	280	6 235
Attack phase	110	3 281
Total originally malarious areas	3 983	47 562

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	61	62
Evaluation operations	2	215	217
Administrative and other	1	41	42
Transport	-	38	38
Total	4	355	359

TRANSPORT FACILITIES

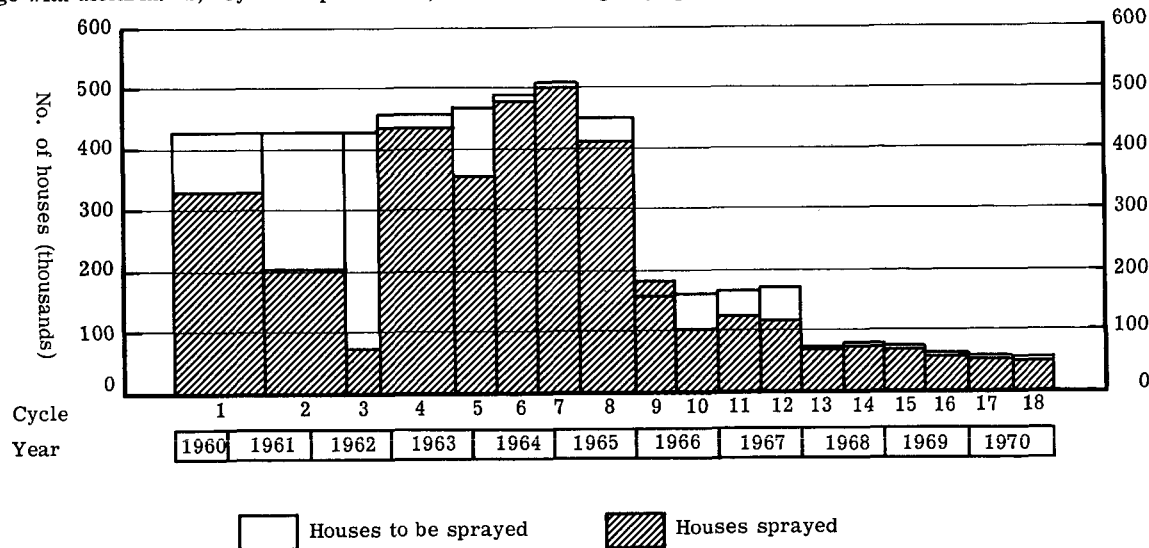
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	14	54	13	81
Two-wheel vehicles	-	132 ^{a)}	2	134
Boats	-	-	-	-
Animals	-	69	-	69
Other	-	-	-	-
Total	14	255	15	284

a) Property of the users.

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed with DDT						Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
		Twice a year			Once a year			Planned	Protected		
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed				
3rd ^{a)}	Mar. 60-Mar. 62	1st	428 615	332 944	-	-	-	2 206 080	1 713 612	495	9.0
		2nd	428 615	204 531	-	-	-	2 241 656	1 083 459	472	8.4
(b)	Apr. 62-Oct. 62	3rd	428 615	72 499	-	-	-	2 241 656	368 201	424	8.4
4th	Nov. 62-Mar. 64	4th	462 900	438 706	-	-	-	2 530 674	2 398 328	468	8.2
		5th	472 000	359 653	-	-	-	2 428 110	1 850 166	475	8.4
5th	Apr. 64-Mar. 65	6th	490 000	480 537	-	-	-	2 316 181	2 271 494	449	9.8
		7th	510 575	500 343	-	-	-	2 315 764	2 269 357	355	10.5
6th	Apr. 65-Jun. 66	8th	450 215	411 193	-	-	-	2 104 080	1 921 727	357	10.0
		9th	68 444	68 056	-	89 312	117 205 ^{c)}	728 974	856 077	335	10.4
7th	Jul. 66-Jun. 67	10th	72 769	77 956	-	89 312	25 548	778 783	497 333	339	9.5
		11th	80 772	78 252	-	87 038	46 259	671 240	573 884	348	10.6
8th	Jul. 67-Jun. 68	12th	83 802	80 271	-	87 038	36 622 ^{c)}	683 360	520 388	363	10.3
		13th	73 726	71 011	-	-	118 ^{d)}	346 512 ^{e)}	336 423	346	11.1
9th	Jul. 68-Jun. 69	14th	79 143	72 675	-	-	1 093 ^{d)}	371 972 ^{e)}	347 189	344	10.5
		15th	77 006	71 818	-	-	-	347 189	341 660	365	10.5
10th	Jul. 69-Jun. 70	16th	68 036	64 371	-	-	-	307 016	311 958	352	9.9
		17th	66 729	63 938	-	-	-	299 427	304 552	351	9.7
11th	Jul. 70-Dec. 70	18th	58 970	56 874	-	-	-	270 123	273 700	340	10.2

a) Previous coverage with dieldrin. b) Cycle suspended. c) Includes emergency sprayings. d) Emergency sprayings. e) Estimated.



DOMINICAN REPUBLIC (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958a)	17 784	2 676	15.0	...	...	...
1959	28 721	3 743	13.0	1 968	1 767	8
1960	20 337	5 540	27.2	3 583	1 949	8
1961	21 946	2 523	11.5	1 164	1 358	1
1962	19 742	548	2.8	275	271	2
1963	73 352	386	0.5	129	256	1
1964	121 211	321	0.3	103	201	17
1965	205 836	84	0.04	38	41	5
1966	438 291	422	0.1	196	207	19
1967	604 888	117	0.02	54	61	2
1968	213 503	17	0.008	15	2	-
1969	178 322	105	0.06	104	1	-
1970	101 276	159	0.2	159	-	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1966	319	66 839	21.0	7	4	1	1	1	-	-	-	1	6	-
1967	371	97 632	26.3	10	-	1	9	-	-	-	-	10	-	-
1968	3 321	386 692	11.6	1	-	1	-	-	-	-	-	-	-	1
1969	3 443	395 013	11.5	11	2	8	-	-	1	-	-	2	-	9
1970	280	69 988	25.0	-	-	-	-	-	-	-	-	-	-	-

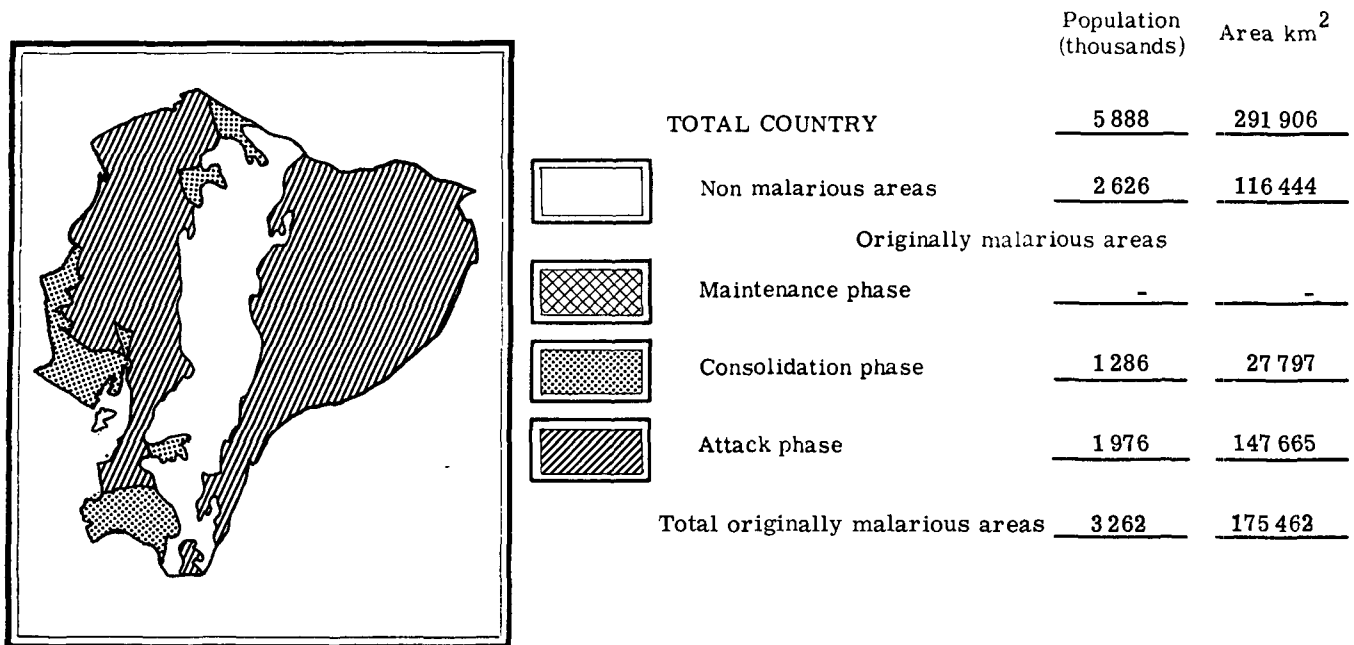
MAINTENANCE PHASE AREAS

1968	208	55 007	26.4	3	-	1	2	-	-	-	-	2	1	-
1969	212	56 360	26.6	8	-	-	-	8	-	-	-	8	-	-
1970	3 593	456 957	12.7	2	1	-	1	-	-	-	-	2	-	-

a) June-December.

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STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	3	649	652
Evaluation operations	10	189	199
Administrative and other	2	104	106
Transport	-	82	82
Total	15	1 024	1 039

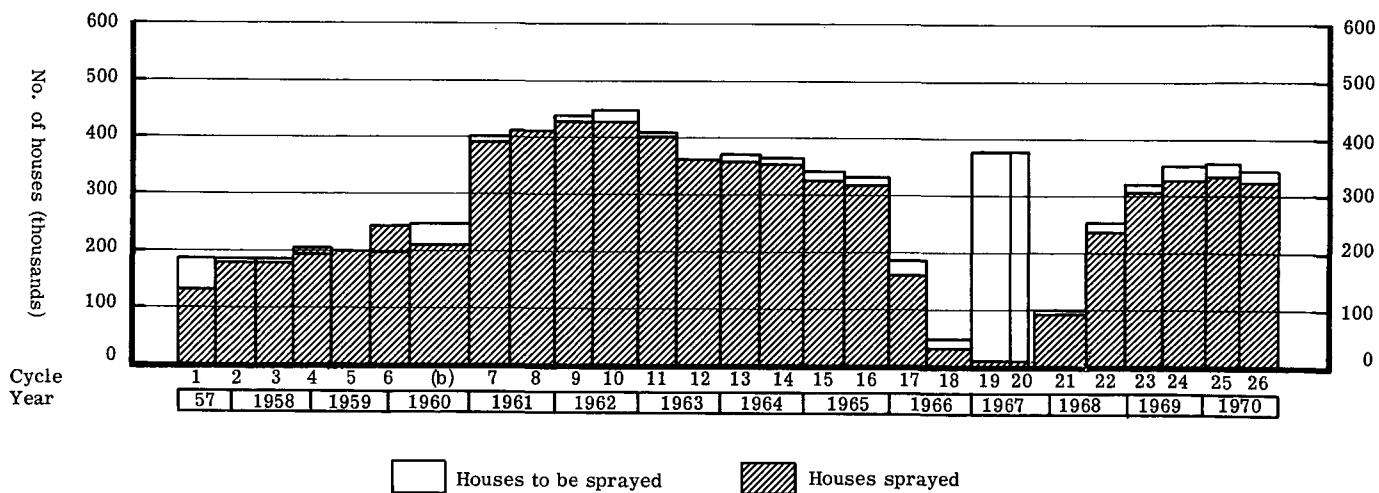
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	40	-	50	90
Two-wheel vehicles	-	59	16	75
Boats	27	8	5	40
Animals	270	50	-	320
Other	35	15	-	50
Total	372	132	71	575

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Mar-57-Mar. 58	1st + 2nd	42 418	63 284	1st	244 304	257 697	1 587 866	1 777 566	590	114	8.0
2nd	Apr. 58-Mar. 59	3rd	48 104	50 089	2nd	280 832	144 069	1 047 229	1 078 629	490	123	6.9
		4th	48 391	83 018									127 348	980 474	1 092 450	436	169	8.5
3rd	Apr. 59-Mar. 60	5th	76 577	72 370	3rd a)	260 539	135 187	949 386	952 664	399	119	9.3
		6th	76 577	97 790 a)									136 542 a)	995 761	1 128 111	403	122	8.8
(b)	Apr. 60-Dec. 60	(b)	251 768	227 411	-	-	-	1 016 387	918 151	424	-	8.9
4th	Jan. 61-Dec. 61	7th	403 989	394 246	-	-	-	1 954 095	1 907 065	446	-	8.4
		8th	413 951	412 008	-	-	-	1 897 137	1 888 183	502	-	8.5
5th	Jan. 62-Dec. 62	9th	438 027	428 269	-	-	-	2 069 240	2 023 097	529	-	8.4
		10th	448 716	428 329	-	-	-	2 119 734	2 023 430 c)	557	-	8.2
6th	Jan. 63-Dec. 63	11th	400 362	409 722	-	-	-	2 360 935	2 416 436	581	-	8.2
		12th	363 437	363 304	-	-	-	1 553 330	1 552 883	602	-	8.2
7th	Jan. 64-Dec. 64	13th	374 284	362 930	-	-	-	1 829 500	1 774 020	620	-	7.8
		14th	367 377	357 206	-	-	-	1 606 760	1 562 305	630	-	7.9
8th	Jan. 65-Dec. 65	15th	343 390	328 679	-	-	-	1 494 330	1 430 345	627	-	7.5
		16th	330 691	316 519	-	-	-	1 453 023	1 390 756	570	-	7.7
9th	Jan. 66-Dec. 66	17th	186 353	160 889 d)	-	-	-	783 316	676 293	480	-	7.4
		18th	47 478	33 934	-	-	-	193 473	138 300	484	-	7.3
10th	Jan. 67-Oct. 67	19th	375 411	8 524 e)	-	-	-	...	43 856	519	-	6.2
		20th	375 411	6 308 e)	-	-	-	...	37 359	547	-	6.1
11th	Jan. 68-Jan. 69	21st	96 429	91 538 f)	-	-	-	412 868	391 841	551	-	5.8
		22nd	254 234	239 429 f)	-	-	-	1 247 637	1 103 686	479	-	6.8
12th	Feb. 69-Jan. 70	23rd	321 655	308 631 e)	-	-	-	1 496 262	1 405 607	573	-	7.4
		24th	352 330	339 908 e)	-	-	-	1 527 804	1 509 280	603	-	7.8
13th	Jan. 70-Dec. 70	25th	359 494	339 793 e)	-	-	-	1 623 163	1 563 261	605	-	7.5
		26th	346 930	328 728 e)	-	-	-	1 595 285	1 389 097	610	-	7.5

a) Cycle suspended. b) Emergency spraying. c) Estimated. d) Not included 21 533 supplementary house-spraying. e) Not included focal sprayings. f) Not included 39 527 houses sprayed in consolidation areas.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957	38 631	1 675	4.3	864	808	3
1958	65 521	4 421	6.7	2 411	2 006	4
1959	98 977	5 887	5.9	2 313	3 571	3
1960	119 562	9 084	7.6	3 158	5 906	20
1961	213 169	9 733	4.6	1 489	8 243	1
1962	269 004	5 531	2.1	658	4 868	5
1963	199 675	3 760	1.9	231	3 509	20
1964	174 203	4 246	2.4	251	3 994	1
1965	160 840	3 731	2.3	178	3 553	-
1966	151 467	4 315	2.8	177	4 138	-
1967a)	147 476	9 077	6.2	688	8 389	-
1968	198 791	32 383	16.3	3 878	28 493	12
1969	256 852	44 038	17.1	3 849	40 183	6
1970	218 663	24 076	11.0	2 571	21 497	8

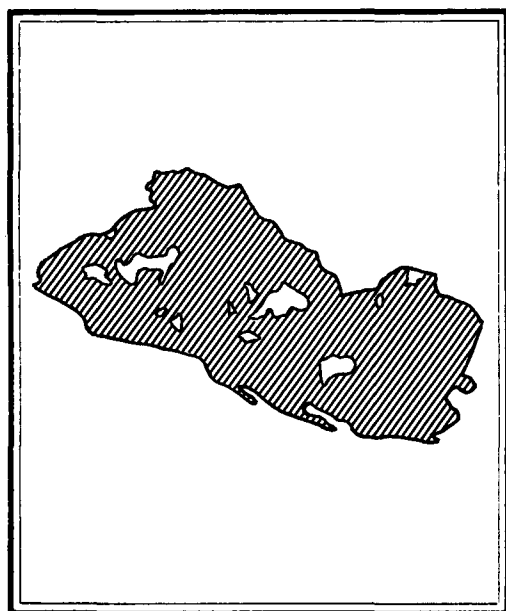
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1963	927	86 778	9.4	97	-	-	-	97	-	-	-	6	90	1
1964	1 053	140 497	13.3	382	36	3	-	198	-	9	136	13	369	-
1965	1 288	179 287	13.9	448	72	20	6	278	1	18	53	25	423	-
1966	1 327	160 354	12.1	661	128	7	-	224	-	23	279	229	432	-
1967a)	1 336	142 184	10.6	1 688	147	1	-	429	-	10	1 101	268	1 420	-
1968	1 376	151 392	11.0	4 660	190	3	-	1 369	-	8	3 090	318	4 342	-
1969	1 294	164 798	12.7	6 919	479	40	1	2 567	2	88	3 742	468	6 451	-
1970	1 286	142 216	11.1	4 299	318	75	3	948	-	52	2 903	257	4 042	-

a) Figures for November not separated by phase.

EL SALVADOR

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>3 512</u>	<u>21 149</u>
Non malarious areas	<u>448</u>	<u>1 697</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>3 064</u>	<u>19 452</u>
Total originally malarious areas	<u>3 064</u>	<u>19 452</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	387	388
Evaluation operations	7	463	470
Administrative and other	1	70	71
Transport	-	112	112
Total	9	1 032	1 041

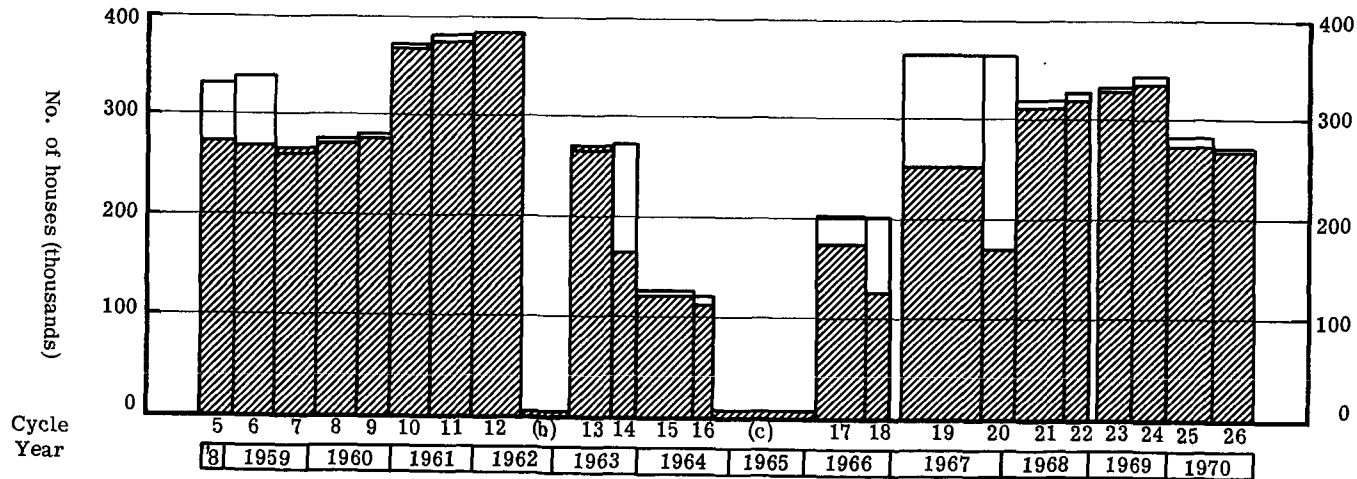
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	43	10	58	111
Two-wheel vehicles	-	16	119	135
Boats	1	-	7	8
Animals	-	-	-	-
Other	-	-	-	-
Total	44	26	184	254

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Propoxur			Planned	Protected	DDT	Propoxur	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
3rd	Aug. 58-Jul. 59 ^{a)}	5th	331 975	273 788	-	-	-	1 575 885	1 299 671	493	-	8.6
		6th	341 277	270 719	-	-	-	1 620 050	1 285 197	527	-	
4th	Aug. 59-Jul. 60	7th	261 102	265 361	-	-	-	1 237 362	1 257 537	573	-	7.7
		8th	278 991	276 050	-	-	-	1 289 775	1 277 428	545	-	
5th	Aug. 60-Jun. 61	9th	281 430	279 481	-	-	-	1 360 400	1 297 262	528	-	7.6
		10th	368 841	371 715	-	-	-	1 700 000	1 713 252	526	-	
6th	Jul. 61-Jul. 62	11th	380 283	377 551	-	-	-	1 748 922	1 736 431	546	-	9.2
		12th	387 944	386 094	-	-	-	1 742 645	1 734 366	562	-	
(b)	Aug. 62-Feb.63	(b)	3 901	3 816	-	-	-	20 117	19 680	809	-	6.7
7th	Mar.63-Dec.63	13th	267 239	270 703	-	-	-	1 206 851	1 222 430	559	-	9.3
		14th	273 344	165 666	-	-	-	1 255 742	761 151	506	-	
8th	Jan. 64-Nov.64	15th	127 000	125 854	-	-	-	581 745	576 496	536	-	8.4
		16th	125 806	114 441	-	-	-	577 568	525 392	533	-	
(c)	Dec. 64-Feb.66	(c)	-	6 396	-	-	-	-	-	-	-	9.4
9th	Mar.66-Dec.66	17th	203 812	175 158	-	-	-	939 492	807 413	602	-	8.1
		18th	203 812	126 954	-	-	-	928 853	578 583	562	-	
10th	Feb. 67-Ene.68	19th	366 344	252 243	-	-	-	1 685 182	1 146 489	596	-	8.4
		20th	366 343	180 101	-	-	-	1 465 372	770 012	551	-	
11th	Feb. 68-Dec.68	21st	318 723	314 565	-	-	-	1 441 928	1 402 421	588	-	8.6
		22nd	324 888	318 408	-	-	-	1 454 112	1 409 950	562	-	
12th	Feb. 69-Dec.69	23rd	334 576	328 778	-	-	-	1 603 899	1 443 932	575	-	8.4
		24th	335 126	346 004	-	-	-	1 714 893	1 995 751	513	-	
13th	Jan. 70-Dec.70	25th	283 480	273 886	1st	16 832	16 151	1 361 790	1 332 517	458	270	10.1
		26th	269 983	264 597	2nd	16 655	15 707	1 312 696	1 309 710	450	277	

a) Date in which DDT started to be used; prior to that DDT and dieldrin were used. b) Spraying discontinued; only one locality was sprayed. c) Emergency spraying.



□ Houses to be sprayed ▨ Houses sprayed

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957	29 171	6 661	22.8	3 001	3 655	5
1958	51 615	9 351	18.1	4 419	4 932	-
1959	71 295	17 521	24.6	4 051	13 470	-
1960	75 381	10 012	13.3	2 947	7 064	1
1961	127 293	12 563	9.9	2 965	9 594	4
1962	194 069	15 433	7.9	2 556	12 873	4
1963	238 791	17 846	7.5	1 879	15 962	5
1964	350 843	25 857	7.4	2 661	23 195	1
1965	506 442	34 070	6.7	2 186	31 884	-
1966	533 047	68 562	12.9	10 703	57 859	-
1967	535 494	82 960	15.5	7 226	75 734	-
1968	692 671	31 526	4.5	968	30 558	-
1969	858 916	25 299	2.9	1 955	23 344	-
1970	572 373	45 436	7.9	4 202	41 234	-

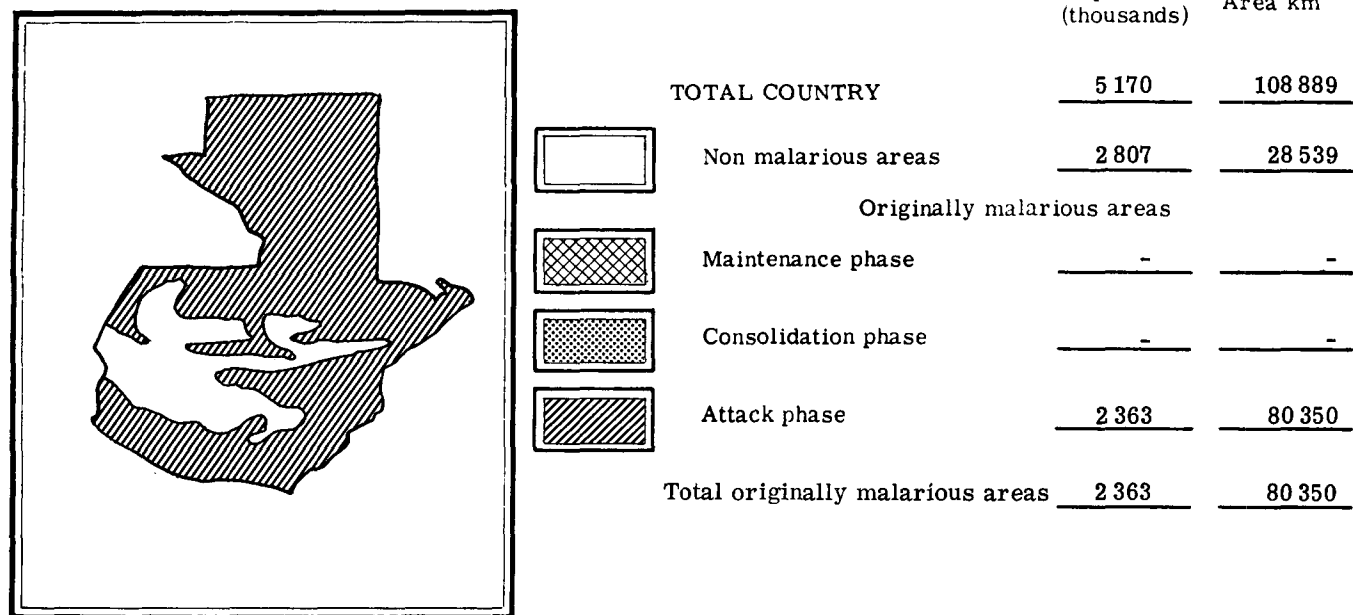
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au-tochtho-nous	Relaps-ing	Imported		Induced	Intro-duced	Not investi-gated and unclassi-fied	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malar-ia</u> <u>iae</u>
							from abroad	from areas within country						
1968 ^{a)}	505 ^{a)}	112 640	22.3	4 305	487	592	47	773	-	-	2 406	55	4 250	-

a) Beginning 1969 this area was brought to attack phase.

GUATEMALA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	494	494
Evaluation operations	5	353	358
Administrative and other	-	93	93
Transport	-	69	69
Total	5	1 009	1 014

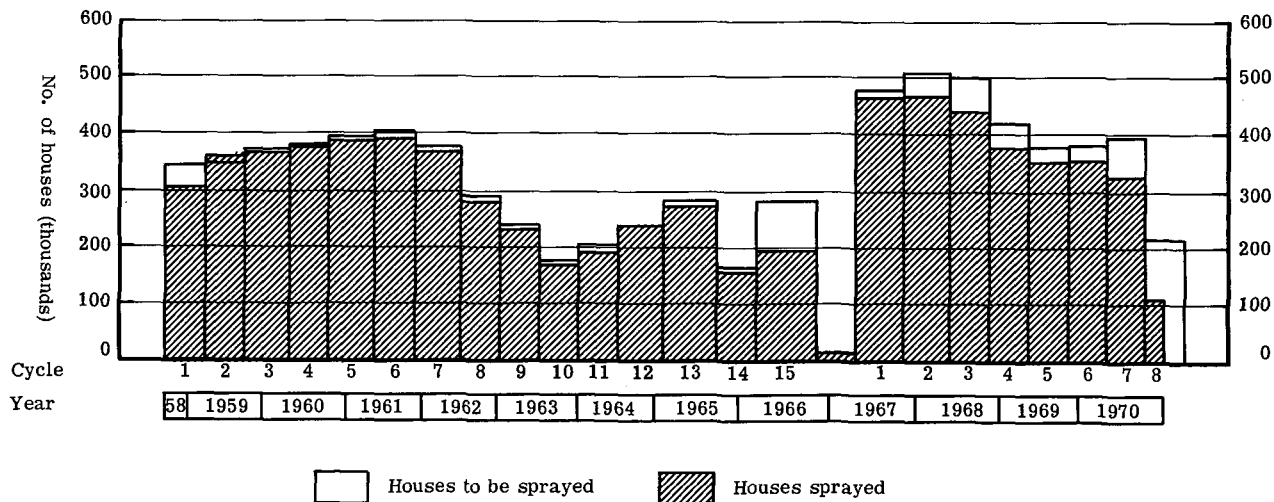
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	97	11	16	124
Two-wheel vehicles	180	60	66	306
Boats	8	2	2	12
Animals	-	-	-	-
Other	-	-	-	-
Total	285	73	84	442

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
3rd ^{a)}	Oct. 58-Oct. 59	1st	341 000	301 329	1 482 670	1 310 317	427	8.8
		2nd	342 586	357 104	1 481 342	1 544 144	542	7.5
4th	Nov. 59-Nov.60	3rd	373 641	368 269	1 460 936	1 439 781	541	7.1
		4th	377 381	378 636	1 654 816	1 660 207	560	8.1
5th	Dec. 60-Dec.61	5th	396 588	386 737	1 815 183	1 769 971	588	7.8
		6th	406 807	393 090	1 737 473	1 678 906	557	7.9
6th	Jan. 62-Jan. 63	7th	375 000	368 135	1 562 625	1 534 089	553	7.5
		8th	291 490	280 687	1 185 781	1 141 867	589	7.5
7th	Feb. 63-Jan. 64	9th	243 511	231 824	949 936	904 382	537	7.6
		10th	175 000	171 061	642 950	628 563	502	8.0
8th	Feb. 64-Jan. 65	11th	205 686	193 780	748 945	705 594	510	8.1
		12th	239 819	239 859	1 060 576	1 060 758	508	8.0
9th	Feb. 65-Mar.66	13th	281 102	268 636 ^{b)}	1 067 260	1 019 937	506	8.2
		14th	165 071	162 100 ^{c)}	697 340	685 083	523	8.3
10th	Apr. 66- Feb.67	15th	282 310	192 058	1 039 183	706 972	557	7.8
		16th	...	15 693	...	129 536	542	7.7
11th	Feb. 67-Mar.68	1st ^{d)}	478 038	468 963	1 912 152	1 778 666	550	7.7
		2nd	511 193	467 976	1 891 414	1 793 133	531	7.8
12th	Apr. 68-Mar.69	3rd	500 444	443 408	1 814 885	1 727 243	545	7.7
		4th	416 861	378 313	1 499 045	1 439 806	544	7.6
13th	Apr. 69-Mar.70	5th	379 477	350 848	1 346 643	1 354 349	535	7.7
		6th	382 532	352 988	1 348 215	1 321 466	540	7.7
14th	Apr. 70-Dec.70	7th	397 810	326 349	1 311 312	1 197 406	529	7.8
		8th ^{e)}	216 798	110 575 ^{f)}	721 685	360 346	497	7.8

a) Previous coverage with dieldrin. b) 115 204 houses were sprayed in annual cycles and 3 908 in emergency sprayings. c) Includes 5 791 houses sprayed in emergency sprayings. d) First cycle of 3-Year Plan. e) Cycle not yet finished. f) Includes 8 197 houses sprayed in two quarterly cycles.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1956a)	8 030	2 111	26.3	538	1 573	-
1957	25 232	5 653	22.4	1 837	3 812	4
1958	62 119	12 829	20.6	5 043	7 786	-
1959	108 048	7 894	7.3	1 548	6 346	-
1960	129 741	3 387	2.6	417	2 969	1
1961	219 628	4 083	1.9	780	3 298	5
1962	275 003	5 783	2.1	1 539	4 224	20
1963	216 217	12 270	5.7	4 660	7 565	45
1964	167 261	17 241	10.3	4 293	12 914	34
1965	242 012	11 730	4.8	2 053	9 676	1
1966	352 046	21 371	6.1	3 189	18 179	3
1967	439 192	19 684	4.5	1 377	18 306	1
1968	492 940	10 407	2.1	360	10 047	-
1969	521 336	10 494	2.0	202	10 291	1
1970	447 706	11 044	2.5	81	10 963	-

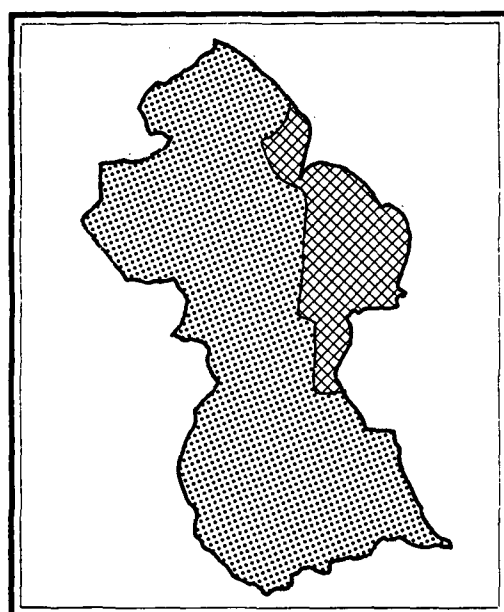
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962	581	48 370	8.3	213	2	-	-	100	-	-	111	62	151	-
1963	1 234	132 149	10.7	2 846	178	142	-	554	-	2	1 970	897	1 945	4
1964	1 057	121 797	11.5	3 160	154	335	-	511	-	1	2 159	710	2 444	6
1965	887	138 550	15.6	2 742	296	272	-	111	-	-	2 063	260	2 481	1
1966 ^{b)}	845	24 393 ^{c)}	11.5	674	81	29	1	9	-	-	554	38	636	-

a) August-December. b) Beginning April, consolidation areas reclassified to attack phase. c) January-March.

GUYANA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>714</u>	<u>215 025</u>
Non malarious areas	<u>-</u>	<u>-</u>
Originally malarious areas		
Maintenance phase	<u>671</u>	<u>39 437</u>
Consolidation phase	<u>43</u>	<u>175 588</u>
Attack phase	<u>-</u>	<u>-</u>
Total originally malarious areas	<u>714</u>	<u>215 025</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	18	18
Evaluation operations	4 (1)	35	39 (1)
Administrative and other	-	4	4
Transport	-	20	20
Total	4 (1)	77	81 (1)

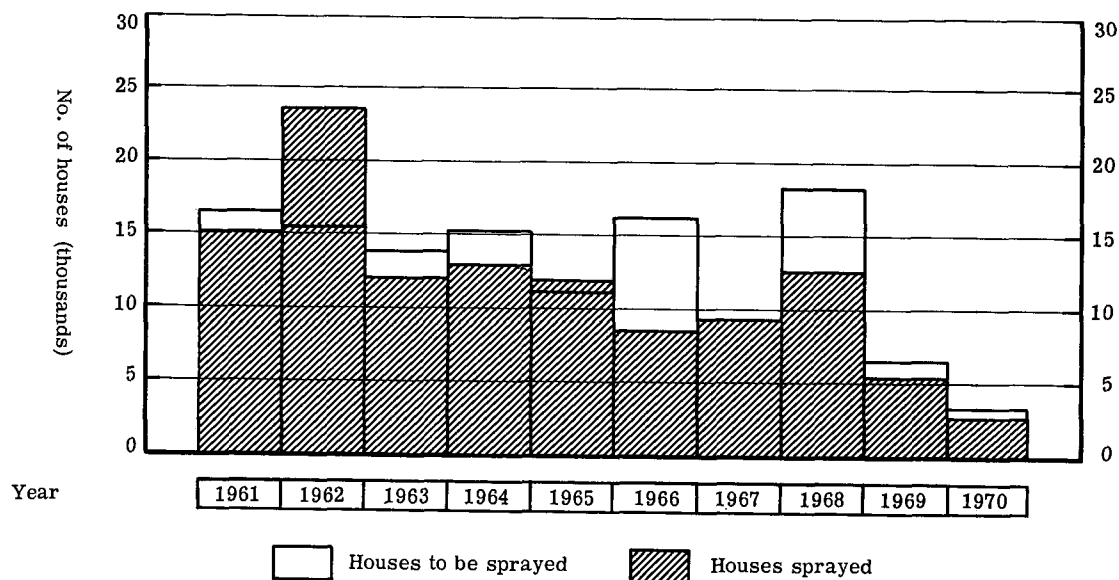
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	7	3	10
Two-wheel vehicles	-	10	-	10
Boats	-	-	13	13
Animals	-	3	-	3
Other	-	-	-	-
Total	-	20	16	36

(Part-time personnel in parentheses)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
		Once a year			Twice a year			Planned	Protected		
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed				
...	Jan. 61-Dec. 61	...	16 538	15 107	-	-	-	82 062	74 964	195	4.6
...	Jan. 62-Dec. 62	...	9 542	10 273	...	6 131	13 535	76 563	116 305	183	8.3
...	Jan. 63-Sep. 63	...	6 726	4 270	...	7 218	7 961	68 123	59 542	346	7.3
...	Jan. 64-Dec. 64	...	6 563	5 408	...	4 236	5 280	63 243	54 986	295	4.3
...	Jan. 65-Dec. 65	...	6 358	4 361	...	4 236	2 384				
...	Jan. 65-Dec. 65	...	6 358	4 361	...	2 341	2 759	46 000	47 467	227	4.6
...	Feb. 66-Dec. 66	...	8 217	718	...	2 341	4 001				
...	Feb. 66-Dec. 66	...	8 217	718	...	3 889	4 833	70 362	36 256	461	4.3
...	Feb. 67-Dec. 67	...	-	-	...	4 619	3 067				
...	Feb. 67-Dec. 67	...	-	-	...	...	5 075	...	20 972	318	6.2
...	Jan. 68-Dec. 68	-	-	-	...	...	4 167				
...	Jan. 68-Dec. 68	-	-	-	...	12 304	7 094	35 053	35 053	199	6.5
...	Feb. 69-Dec. 69	-	-	-	...	5 979	5 414				
...	Feb. 69-Dec. 69	-	-	-	...	6 542	5 477	32 033	22 971	310	5.8
...	Feb. 70-Dec. 70	-	3 267	2 883	-	-	-				
...	Feb. 70-Dec. 70	-	3 267	2 883	-	-	-	38 674	11 063	234	5.6



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	1 520	51	3.36	23	8	20
1959	3 754	176a)	4.68	53	100	13
1960	3 674	263a)	7.16	175	67	12
1961	15 515	218	1.40	57	156	5
1962	14 358	425	2.96	266	159	-
1963	16 780	473a)	2.81	414	56	-
1964	35 091	223	0.64	190	33	-
1965	22 950	25	0.11	24	1	-
1966	14 098	17	0.12	15	2	-
1967	21 389	175	0.82	145	29	1
1968	32 064	44	0.14	20	24	-
1969	47 966	12	0.04	12	-	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1965	26	15 500	59.6	1	1	-	-	-	-	-	-	-	1	-
1966	30	22 141	73.8	882	...	...	...	...	...	...	...	...	882	-
1970 ^{b)}	43	45 986	107.0	17	-	-	15	-	-	-	2	9	8	-

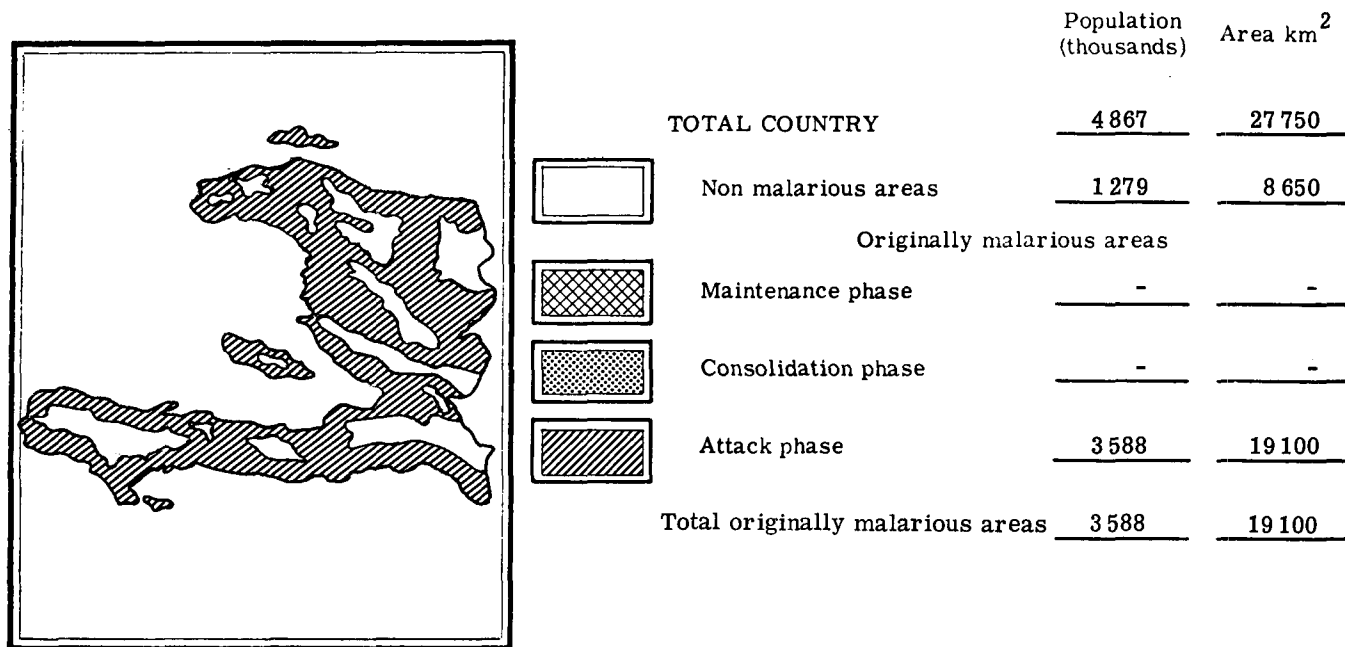
MAINTENANCE PHASE AREAS

1958	430	1	0.0	-	-	-	-	-	-	-	-	-	-	-
1959	460	-	0	-	-	-	-	-	-	-	-	-	-	-
1960	494	-	0	-	-	-	-	-	-	-	-	-	-	-
1961	515	1 374	0.3	13	-	-	1	12	-	-	-	1	12	-
1962	556	21 088	3.8	21	17	3	-	1	-	-	-	-	21	-
1963	572	15 475	2.7	3	-	2	1	-	-	-	-	1	2	-
1964	589	20 094	3.4	2	-	-	2	-	-	-	-	2	-	-
1965	602	23 057	3.8	2	-	-	1	-	-	-	1	2	-	-
1966	627	17 430	2.8	11	...	...	...	...	...	...	...	1	10	-
1967	637	12 774	2.0	-	-	-	-	-	-	-	-	-	-	-
1968	658	23 153	3.5	17	-	-	-	17	-	-	-	7	10	-
1969	678	22 155	3.3	7	-	-	1	6	-	-	-	1	6	-
1970	671	17 637	2.6	1	-	-	-	-	-	-	1	-	1	-

a) Includes undifferentiated mixed infections. b) The area previously in attack was passed to consolidation in 1970.

HAITI

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	1 245	1 246
Evaluation operations	10	216	226
Administrative and other	-	192	192
Transport	-	59	59
Total	11	1 712	1 723

TRANSPORT FACILITIES

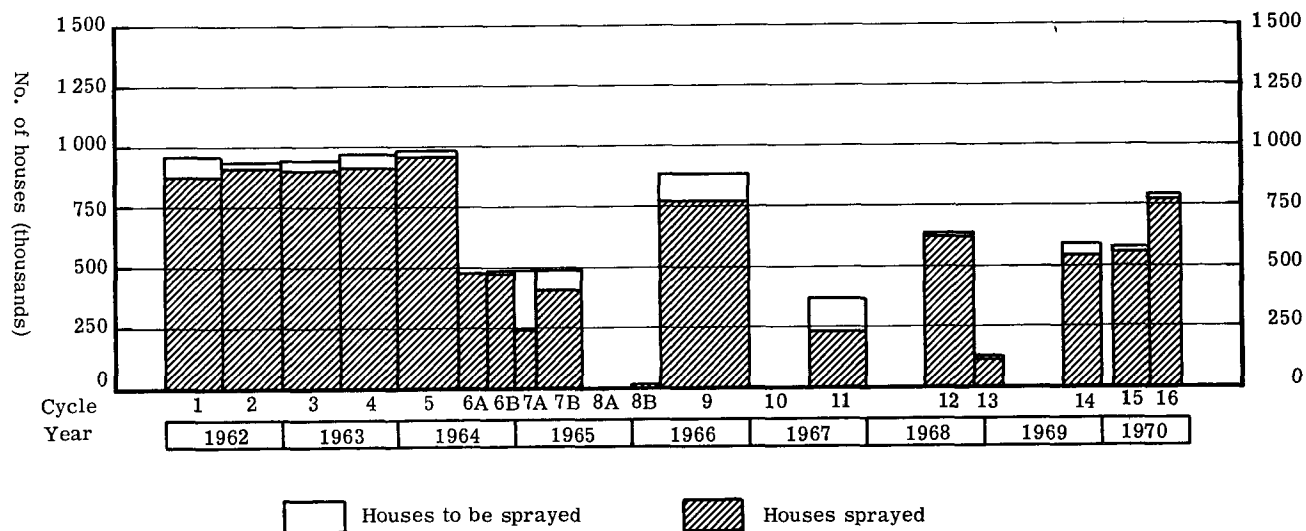
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	65	-	-	65
Two-wheel vehicles	-	-	-	-
Boats	3	-	-	3
Animals	-	-	-	-
Other	-	-	-	-
Total	68	-	-	68

HAITI (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
1st	Jan. 62-Dec. 62	1st	952 301	885 549 ^{a)}	3 490 183	3 245 821	220	14.3
		2nd	929 415	906 846	3 311 505	3 231 438	196	16.6
2nd	Jan. 63-Dec. 63	3rd	940 397	902 687	3 297 032	3 165 209	217	15.4
		4th	964 942	914 340	3 186 238	3 019 259	235	16.2
3rd	Jan. 64-Dec. 64	5th	984 853	974 136	3 317 674	3 281 609	243	16.1
		6th A ^{b)}	457 066	454 029	1 459 549	1 449 893	127	16.8
		6th B ^{b)}	465 260	455 353	1 446 450	1 446 458	122	17.5
		7th A ^{b)}	465 907	246 414	1 447 900	765 795	119	18.3
4th	Jan. 65-Jan. 66	7th B ^{c)}	465 907	404 692	1 477 205	1 283 123	234	17.9
		8th A ^{d)}	5 657	5 418	21 175	20 280	487	9.9
		8th B ^{d)}	8 178	8 048	27 951	27 508	254	14.2
		9th	865 000	772 513	2 881 920	2 573 852	237	14.8
6th	Jul. 67-Dec. 67	11th	360 049	233 513	...	720 525	295	15.8
7th	Jul. 68-Jan. 69	12th	647 728	639 266	2 452 000	2 188 271	258	14.8
		13th	124 814	121 119	452 000	271 305	234	16.6
8th	Aug. 69-Dec. 69	14th	595 000	549 869	1 617 000	1 685 059	294	15.2
		15th	579 818	576 927	1 637 552	1 687 667	277	15.5
9th	Feb. 70-Nov. 70	16th	799 818	777 773	2 162 437	2 330 412	270	14.5

a) 10 016 houses were sprayed with dieldrin. b) Quarterly cycles, using DDT 1g/m². c) Quarterly cycles, using DDT 2 g/m². d) Annual cycles.



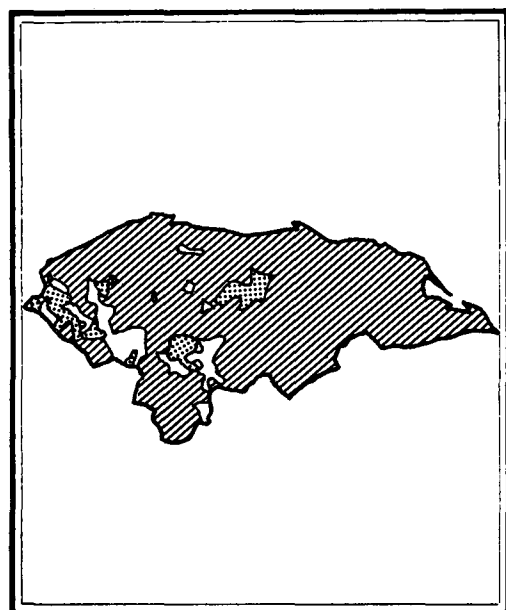
HAITI (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1962	111 142	4 033	3.6	3 441	20	572
1963	386 657	6 662	1.7	5 464	12	1 186
1964	473 297	19 170	4.1	18 422	24	724
1965	752 284	10 304	1.4	9 997	20	287
1966	2 239 469	8 378	0.4	8 208	35	135
1967	1 343 796	4 871	0.4	4 840	3	28
1968	1 173 905	2 562	0.2	2 556	3	3
1969	686 167	5 005	0.7	4 999	1	5
1970	357 366	10 658	3.0	10 654	-	4

HONDURAS

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>2 514</u>	<u>112 088</u>
Non malarious areas	<u>318</u>	<u>10 737</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>423</u>	<u>7 123</u>
Attack phase	<u>1 773</u>	<u>94 228</u>
Total originally malarious areas	<u>2 196</u>	<u>101 351</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	181	181
Evaluation operations	4	132	136
Administrative and other	4	53	57
Transport	-	50	50
Total	8	416	424

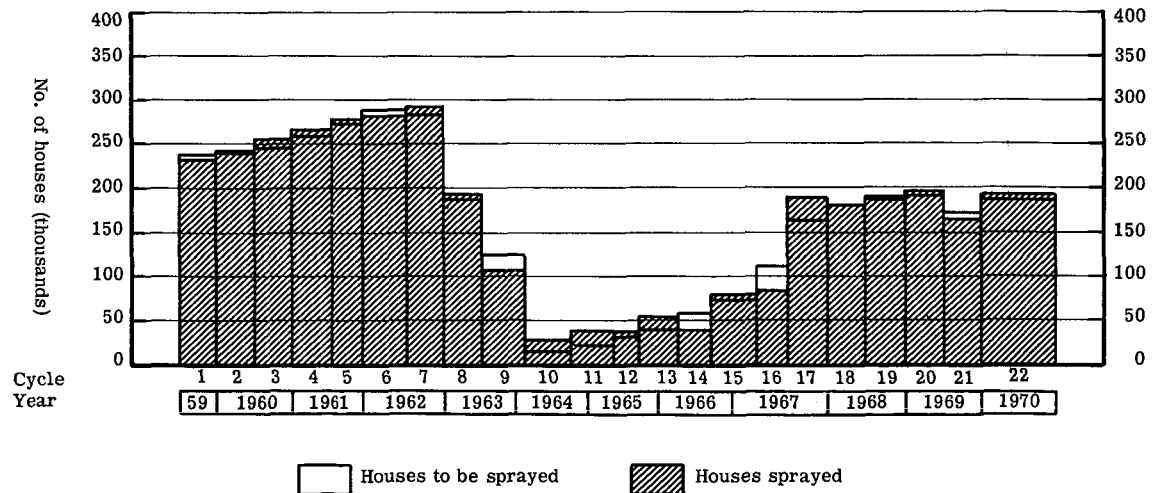
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	55	41	21	117
Two-wheel vehicles	-	30	105	135
Boats	-	-	4	4
Animals	-	177	32	209
Other	-	-	-	-
Total	55	248	162	465

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used (g. technical)		Average houses sprayed per spray-man/day
		DDT			Malathion			Planned	Protected	DDT	Malathion	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Jul. 59-Jun. 60	1st	232 771	236 963	-	-	-	1 252 773	1 275 237	406	-	9.8
		2nd	241 726	242 059	-	-	-	1 277 280	1 279 148	368	-	11.4
2nd	Jul. 60-Jun. 61	3rd	245 572	254 699	-	-	-	1 274 028	1 321 450	369	-	11.8
		4th	258 519	265 825	-	-	-	1 314 052	1 351 212	419	-	10.9
3rd	Jul. 61-Jun. 62	5th	276 458	277 941	-	-	-	1 401 919	1 409 325	360	-	11.1
		6th	287 516	285 394	-	-	-	1 421 192	1 410 773	262	-	11.3
4th	Jul. 62-Jun. 63	7th	282 186	290 056	-	-	-	1 376 785	1 415 286	373	-	11.1
		8th	187 905	191 321	-	-	-	877 892	893 861	377	-	11.0
5th	Jul. 63-Aug. 64	9th	126 499	110 612	1st	19 776	20 440	781 085	712 355	404	440	10.5
		10th	14 851	27 719	2nd	17 471	18 286	182 636	262 338	464	343	8.9
					3rd	21 499	23 066	291 630	188 187	481	-	8.8
6th	Sep. 64-Jun. 65	11th	21 502	37 818	4th	23 274	23 614	328 950	425 513	567	550	8.4
		12th	30 377	35 603	5th	22 039	24 997	137 790	161 522	474	-	8.7
					-	-	-	182 636	262 338	464	-	8.9
7th	Jul. 65-Jun. 66	13th	38 035	54 654	-	-	-	291 630	188 187	481	-	8.8
		14th	59 178	38 187	-	-	-	375 410	391 701	441	-	8.4
8th	Jul. 66-Jun. 67	15th	76 185	79 491	-	-	-	544 651	410 160	490	-	8.2
		16th	113 469	83 915	-	-	-	806 510	1 015 546	500	-	7.4
9th	Jul. 67-Jun. 68	17th	164 594	189 567	-	-	-	891 863	891 903	475	-	8.5
		18th	181 273	181 190	-	-	3 957 ^{a)}	915 823	918 403	482	-	8.5
10th	Jul. 68-Jun. 69	19th	186 143	186 861	-	-	10 060 ^{a)}	977 310	932 976	449	-	8.1
		20th	191 937	195 462	-	-	6 109 ^{a)}	856 440	795 210	349	-	8.0
11th	Jul. 69-Dec. 69	21st	171 288	164 954	-	-	8 670 ^{a)}	951 930	928 051	401	-	7.8
12th	Jan. 70-Dec. 70	22th	190 386	191 383 ^{b)}	-	44 706	48 673 ^{c)}	-	-	-	-	-

a) Emergency spraying with DDT. b) Does not include 8 394 emergency sprayings. c) Two quarterly cycles with DDT.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958 ^{a)}	14 183	906	6.4	339	567	-
1959	66 391	6 675	10.1	3 170	3 504	1
1960	109 677	5 517	5.0	1 737	3 780	-
1961	164 965	4 334	2.6	861	3 472	1
1962	229 666	5 747	2.5	597	5 150	-
1963	168 647	6 721	4.0	669	6 052	-
1964	75 286	5 392	7.2	604	4 788	-
1965	113 763	5 082	4.5	141	4 941	-
1966	165 563	13 299	8.0	1 146	12 153	-
1967	296 498	14 324	4.8	832	13 492	-
1968	359 674	13 337	3.7	3 897	9 440	-
1969	432 895	28 318	6.5	5 144	23 174	-
1970	321 763	33 926	10.5	5 534	28 392	-

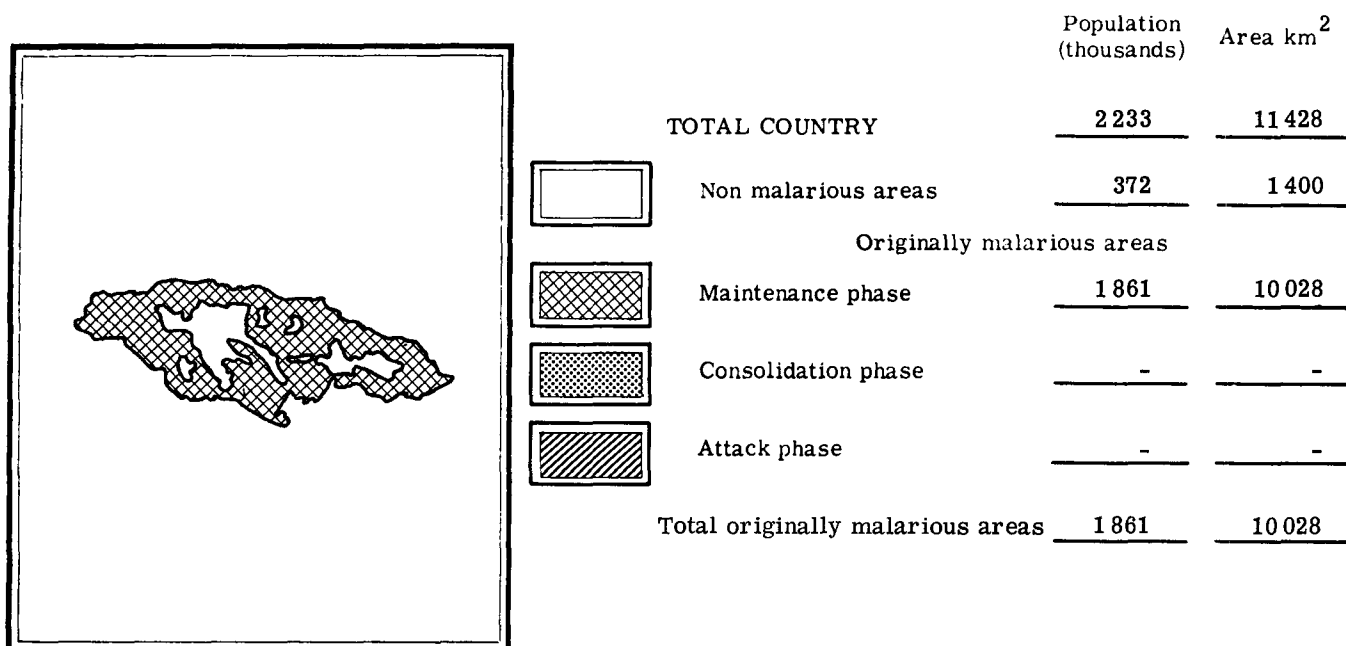
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1962 ^{b)}	46	9 989 ^{b)}	43.4	3	-	1	-	2	-	-	-	-	3	-
1963	941	95 484	10.1	356	177	51	1	84	-	-	43	19	337	-
1964	1 631	131 696	8.1	1 281	711	258	-	143	-	-	169	37	1 244	-
1965	1 518	196 538	13.0	1 870	1 010	222	32	111	-	-	495	22	1 848	-
1966	1 563	195 239	12.5	3 816	1 178	193	16	156	-	-	2 273	58	3 758	-
1967	1 091	169 100	15.5	1 828	814	223	47	304	-	-	440	40	1 788	-
1968	1 124	225 022	20.0	2 329	1 015	147	31	242	-	-	894	384	1 945	-
1969	648	158 649	24.5	1 266	552	60	33	95	-	-	526	229	1 037	-
1970	423	35 673	8.4	611	181	23	-	147	-	-	260	71	540	-

a) Incomplete information. b) July-December.

JAMAICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	13 (1)	29 (55)	42 (56)
Administrative and other	-	31	31
Transport	-	38	38
Total	13 (1)	98 (55)	111 (56)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	21	17	38
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	21	17	38

(Part-time personnel in parentheses)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	56 266	205	0.4	199	-	6
1959	39 726	371	0.9	352	-	19
1960	136 123	133	0.1	122	-	11
1961	153 237	23	0.02	16	-	7

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1960 ^{a)}	313	48 411 ^{a)}	30.9	2	-	2	-	-	-	-	-	-	-	-	2
1961	761	139 664	18.4	8	1	7	-	-	-	-	-	-	-	-	8
1962	1 282	246 592	19.2	2	-	-	1	-	1	-	-	-	1	-	1
1963	1 309	185 459	14.2	3	-	3	-	-	-	-	-	-	-	-	3
1964	1 365	134 824	9.9	1	-	1	-	-	-	-	-	-	-	-	1
1965	1 432	24 443 ^{b)}	6.8	1	-	1	-	-	-	-	-	-	-	-	1

MAINTENANCE PHASE AREAS

1965	1 432	53 854	5.0	2	-	1	1	-	-	-	-	-	2	-	2
1966	1 471	123 799	8.4	2	-	-	2	-	-	-	-	-	1	1	-
1967	1 500	122 007	8.1	2	-	-	2	-	-	-	-	-	1	1	-
1968	1 530	99 581	6.5	2	-	-	2	-	-	-	-	-	1	1	-
1969	1 530	54 227	3.5	0	-	-	-	-	-	-	-	-	-	-	-
1970	1 861	39 817	2.1	2	-	-	2	-	-	-	-	-	2	-	-

a) Consolidation phase began in July 1960. b) January-March.

MEXICO

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>48 314</u>	<u>1 967 183</u>
Non malarious areas	<u>24 397</u>	<u>817 183</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>11 226</u>	<u>434 085</u>
Attack phase	<u>12 691</u>	<u>715 915</u>
Total originally malarious areas	<u>23 917</u>	<u>1 150 000</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	41	3 165	3 206
Evaluation operations	62	1 426	1 488
Administrative and other	16	583	599
Transport	-	199	199
Total	119	5 373	5 492

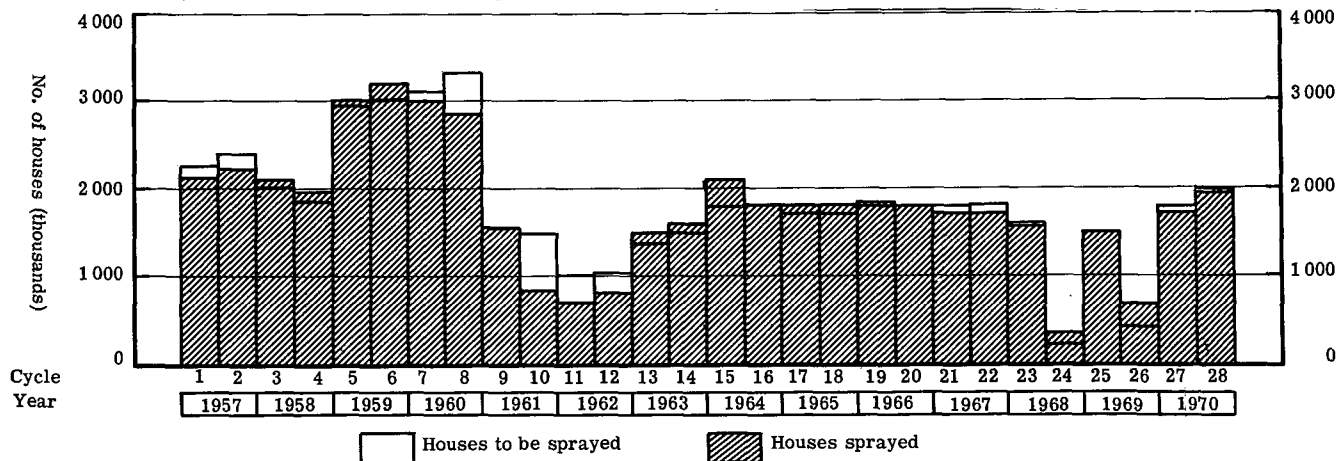
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	300	311	383	994
Two-wheel vehicles	-	-	-	-
Boats	13	8	13	34
Animals	1 666	678	-	2 344
Other	-	-	-	-
Total	1 979	997	396	3 372

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Jan. 57-Dec. 57	1st	2 292 841	2 143 023	1st	(a)	219 662	10 464 526	10 802 292	495	99	9.3
		2nd	2 434 486	2 298 952			459 064	11 113 428	12 597 171	417		9.9
		3rd	2 060 985	2 103 570	2nd	731 872	685 814	12 545 513	12 531 599	402	110	10.3
2nd	Jan. 58-Dec. 58	4th	1 869 911	1 971 557		666 929	531 742	11 362 506	11 212 496	424	113	10.5
		5th	2 973 820	3 050 952	3rd	321 520	246 753	14 492 905	14 505 650	434	112	10.8
		6th	3 018 184	3 219 340		160 136	45 548	14 226 160	14 614 270	434	118	10.4
		7th	3 177 380	3 027 089	4th	68 977	21 390	14 163 856	13 301 924	369	94	10.9
		8th	3 376 695	2 869 083		(a)	1 000	14 681 870	12 481 041	247	83	11.1
		9th	1 575 106	1 582 503	-	-	-	6 571 342	6 602 052	356	-	11.2
		10th	1 575 106	852 287	-	-	-	6 409 106	3 468 283	414	-	10.5
		11th	1 036 386	783 060 ^{b)}	-	-	-	4 151 927	3 135 873	514	-	8.6
		12th	1 036 386	825 082	-	-	-	4 070 924	3 241 041	517	-	8.9
		13th	1 477 793	1 551 297 ^{b)}	-	-	-	5 686 547	5 969 938	512	-	8.6
		14th	1 477 793	1 606 125 ^{b)}	-	-	-	5 572 757	6 056 473	...	-	8.7
		15th	1 808 906	2 190 136 ^{c)}	-	-	-	6 869 682	8 317 653	486	-	8.7
		16th	1 808 906	1 848 155 ^{c)}	-	-	-	6 770 916	6 917 988	476	-	8.7
		17th	1 770 934	1 824 675 ^{c)}	-	-	-	6 278 670	6 469 365	423	-	9.4
		18th	1 770 934	1 812 043 ^{c)}	-	-	-	5 949 098	6 087 346	408	-	9.3
		19th	1 842 180	1 874 530 ^{d)}	-	-	-	6 482 447	6 596 302	420	-	9.4
		20th	1 842 180	1 839 992 ^{d)}	-	-	-	6 202 620	6 195 335	410	-	9.1
		21st	1 814 243	1 781 299 ^{d)}	-	-	-	6 350 024	6 586 286	407	-	9.2
		22nd	1 814 243	1 734 073 ^{d)}	-	-	-	6 350 024	6 217 836	405	-	9.2
		23rd	1 613 582	1 611 594	-	-	-	7 321 030	6 088 368	412	-	9.2
		24th	235 852	361 518	-	-	-	1 583 857	946 966	397	-	8.8
		25th	1 515 935	1 526 901 ^{e)}	-	-	-	5 685 501	5 028 887	482	-	9.3
		26th	407 363	609 871 ^{e)}	-	-	-	1 544 842	1 415 511	551	-	8.6
		27th	1 791 048	1 735 041 ^{f)}	-	-	-	8 955 240	6 742 946	555	-	9.1
		28th	1 991 000	1 931 014 ^{f)}	-	-	-	7 763 460	7 570 041	574	-	8.7

a) Included in DDT column. b) Including houses sprayed once and three times a year. c) Including houses sprayed once, three and four times a year. d) Including houses sprayed once and three times a year, and some sprayed with BHC. e) Includes houses sprayed once a year and focal sprayings in consolidation areas. f) Does not include 5 803 houses sprayed and 23 036 inhabitants from Zone V.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957	175 080	4 387	2.51	514	3 856	17
1958	399 124	3 290	0.82	487	2 779	24
1959	815 038	3 202	0.39	443	2 705	54
1960	1 208 712	3 569	0.29	245	3 251	73
1961	828 360	8 735	1.05	337	8 283	115
1962	727 262	9 642	1.33	139	9 450	53
1963	710 448	12 906	1.82	279	12 581	46
1964	761 832	11 722	1.54	371	11 334	17
1965	787 301	8 559	1.09	44	8 506	9
1966	862 888 ^{a)}	10 054 ^{a)}	1.17	79	9 966	9
1967	796 135	13 515	1.70	41	13 468	6
1968	1 418 672	22 486	1.59	232	22 134	120
1969	1 497 730	46 743	3.12	46	46 591	106
1970	1 322 628	57 435	4.34	3 018	54 374	43

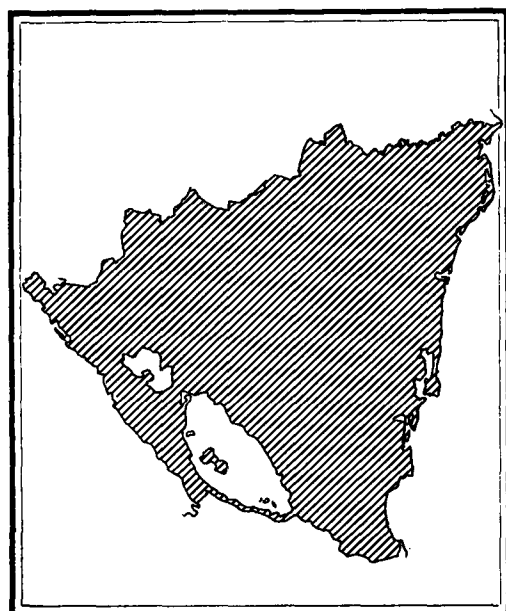
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1958	59	4 449	7.5	-	-	-	-	-	-	-	-	-	-	-	-
1959	59	6 560	11.1	-	-	-	-	-	-	-	-	-	-	-	-
1960 ^{b)}	70	4 058 ^{b)}	7.7	-	-	-	-	-	-	-	-	-	-	-	-
1961	11 721	745 907	6.4	3 114	1 248	446	387	-	12	90	931	91	3 004	19	-
1962	15 592	1 240 130	7.9	4 367	1 211	487	3	695	2	642	1 597	43	4 577	17	-
1963	16 830	1 122 103	6.7	3 835	1 514	73	1	494	5	390	1 358	183	3 634	18	-
1964	12 740	833 491	6.5	1 683	914	78	2	407	4	11	267	83	1 595	5	-
1965	12 995	808 202	6.2	1 554	601	30	9	298	-	21	595	26	1 527	1	-
1966	12 794	709 154	5.5	1 158	579	132	6	231	2	2	206	1	1 155	2	-
1967	13 357	675 708	5.1	1 648	716	336	17	351	2	15	211	3	1 642	3	-
1968	13 574	988 165	7.3	3 554	2 128	407	3	380	15	8	613	4	3 535	15	-
1969	13 817	1 026 330	7.4	5 383	1 511	281	1	374	5	11	3 200	3	5 367	13	-
1970	11 226	567 249	5.0	3 723	966	207	1	316	7	4	2 222	8	3 709	6	-

a) Including 58 269 slides with 188 positives from non-malarious areas adjoining areas under attack phase. b) January-September.

NICARAGUA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	1 988	127 358
Non malarious areas	-	9 000
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 988	118 358
Total originally malarious areas	1 988	118 358

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	369	371
Evaluation operations	5	187	192
Administrative and other	1	51	52
Transport	-	72	72
Total	8	679	687

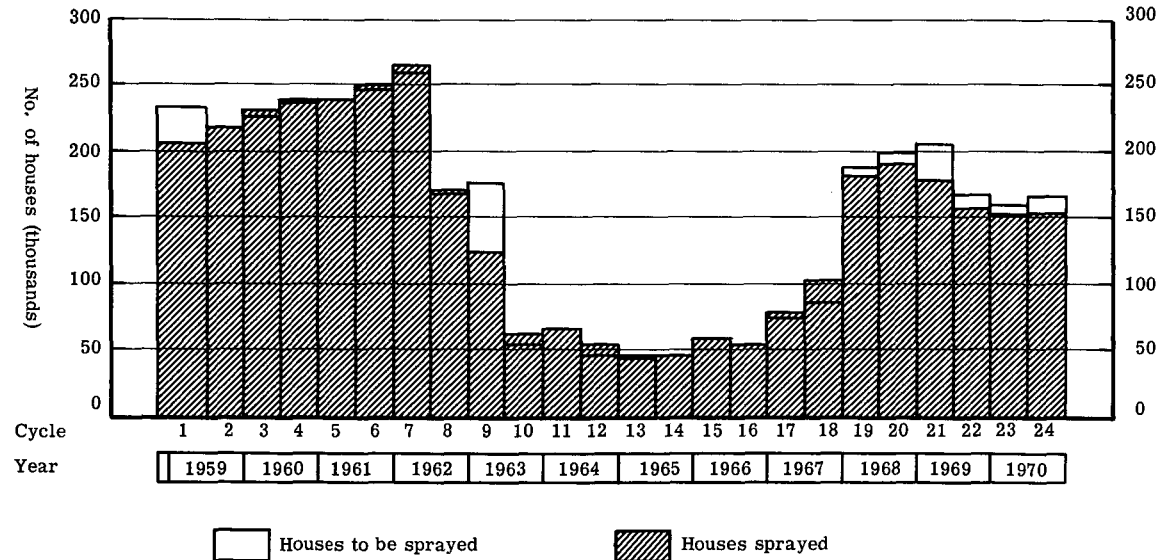
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	4	85	89
Two-wheel vehicles	-	19	-	19
Boats	-	-	27	27
Animals	-	-	-	-
Other	-	-	-	-
Total	-	23	112	135

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Malathion			Planned	Protected	DDT	Malathion	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Nov. 58-Dec. 59	1st	223 220	205 930	-	-	-	1 244 452	1 148 052	401	-	9.2
		2nd	218 312	218 645	-	-	-	1 202 244	1 204 139	325	-	10.3
2nd	Jan. 60-Dec. 60	3rd	226 831	230 478	-	-	-	1 232 373	1 252 160	376	-	9.4
		4th	237 553	239 076	-	-	-	1 275 185	1 283 375	396	-	8.9
3rd	Jan. 61-Dec. 61	5th	237 062	239 375	-	-	-	1 244 338	1 256 399	403	-	9.5
		6th	248 739	249 068	-	-	2 469	1 276 530	1 290 900	396	410	9.2
4th	Jan. 62-Dec. 62	7th	259 760	259 743	-	-	5 079	1 289 708	1 314 866	409	309	9.6
		8th	163 746	164 623	(a)	5 372	5 710	821 913	827 823	440	399	9.3
5th	Jan. 63-Dec. 63	9th	170 580	115 023	(a)	5 958	11 460	863 624	618 699	465	420	9.0
		10th	55 574	59 876	(a)	9 320	11 356	279 693	306 925	471	439	9.0
6th	Jan. 64-Dec. 64	11th	65 151	55 884	(a)	9 445	12 098	337 690	307 741	491	473	8.3
		12th	34 068	37 139	(a)	11 375	16 925	187 480	223 046	493	409	7.7
7th	Jan. 65-Dec. 65	13th	32 752	33 998	(a)	14 817	12 653	206 178	202 201	476	429	7.9
		14th	33 124	30 010	(a)	11 343	14 953	189 793	191 910	436	425	8.5
8th	Jan. 66-Dec. 66	15th	39 458	38 452	(a)	18 844	18 239	275 698	268 086	423	362	8.3
		16th	35 808	36 793	(a)	18 844	16 447	261 914	255 149	420	380	8.3
9th	Jan. 67-Dec. 67	17th	59 766	56 652	(a)	19 203	17 634	379 051	376 386	414	374	8.4
		18th	67 305	86 055	(a)	19 203	17 081	415 238	518 110	410	375	8.3
10th	Jan. 68-Dec. 68	19th	167 410	166 684	(a)	19 702	16 168	787 899	932 662	429	384	8.2
		20th	178 831	171 831	(a)	20 756	19 735	862 107	964 796	403	282	8.8
11th	Jan. 69-Dec. 69	21st	183 385	165 772	(a)	17 378	12 173	876 178	847 580	416	391	8.3
		22nd	165 444	154 829	(a)	1 429	1 429	779 082	796 541	478	259	7.1
12th	Jan. 70-Dec. 70	23rd	161 390	152 595	(b)	25 619	19 204	757 382	764 946	415.8	452	8.2
		24th	166 326	153 410	(c)	71 215	64 854	765 520	692 950	403.5	185 ^d	8.4

a) The date cycles of malathion are in agreement with the cycles of DDT, although the malathion cycles are of four months. b) Two cycles with malathion. c) Summary of 3 quarterly spraying cycles with propoxur, beginning 6 April. d) Propoxur.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	23 982	890	3.7	...	...	...
1959	38 966	1 875	4.8	619	1 256	-
1960	74 074	7 528	10.2	4 217	3 311	-
1961	109 293	8 722	8.0	3 001	5 721	-
1962	162 733	11 200	6.9	3 428	7 772	-
1963	152 339	10 593	6.9	2 742	7 851	-
1964	173 068	11 197	6.5	2 403	8 794	-
1965	167 589	8 670	5.2	883	7 787	-
1966	197 472	13 895	7.0	2 045	11 850	-
1967	269 575	16 321	6.1	2 353	13 968	-
1968	411 544	8 250	2.0	479	7 771	-
1969	498 119	16 043	3.2	2 673	13 370	-
1970	281 386	27 260	9.7	5 180	22 080	-

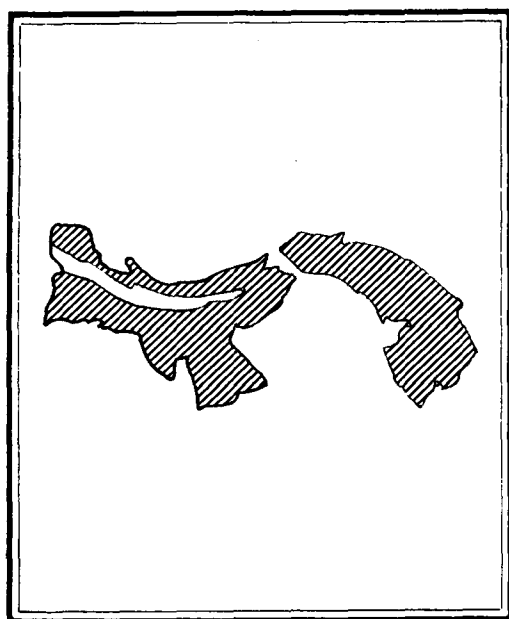
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1962 ^{a)}	515	18 994 ^{a)}	7.4	159	57	13	-	50	-	1	38	26	132	1
1963	668	62 511	9.4	966	494	39	-	230	1	3	199	478	488	-
1964	695	74 543	10.7	1 819	654	140	-	364	1	1	659	506	1 313	-
1965	730	68 945	9.4	1 605	568	221	-	458	-	6	352	154	1 451	-
1966 ^{b)}	665	57 036	8.6	1 752	604	90	-	143	-	-	915	83	1 669	-

a) July-December. b) In 1967, consolidation areas reclassified to attack phase.

PANAMA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	1 464	75 650
Non malarious areas	59	5 810
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	-	-
Attack phase	1 405	69 840
Total originally malarious areas	1 405	69 840

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	375	376
Evaluation operations	1	217 (1)	218 (1)
Administrative and other	4	57	61
Transport	-	21	21
Total	6	670 (1)	676 (1)

TRANSPORT FACILITIES

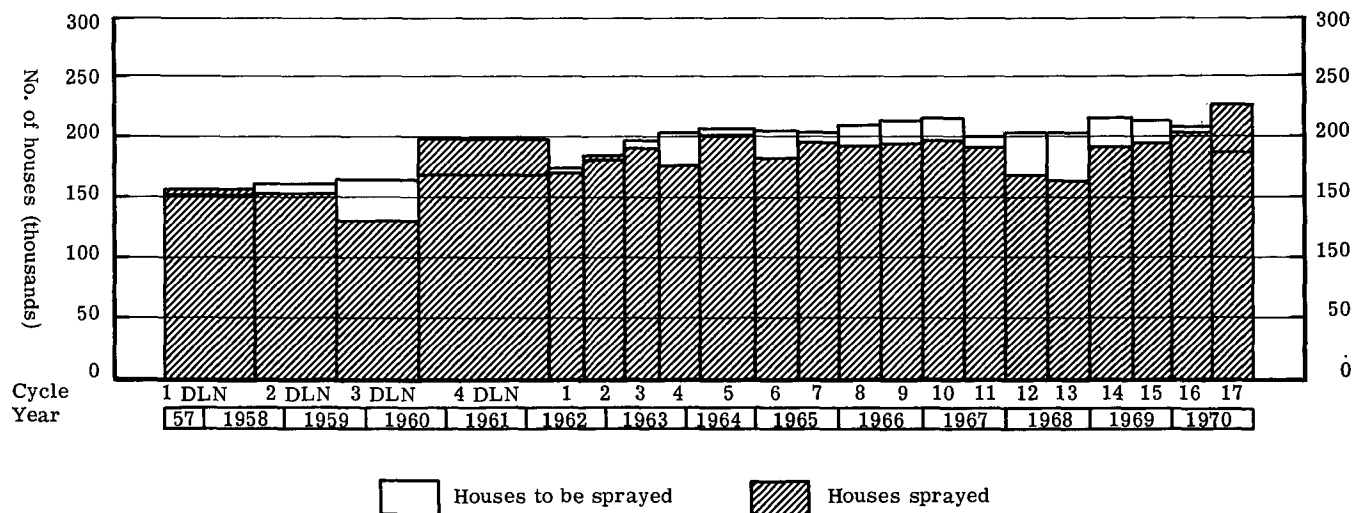
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	86	2	18	106
Two-wheel vehicles	-	55	1	56
Boats	110	30	-	140
Animals	-	-	-	-
Other	-	-	-	-
Total	196	87	19	302

(Part-time personnel in parentheses)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Aug. 57-Aug. 58	-	-	-	1st	152 957	155 963	659 856 a)	671 824 a)	-	119	6.5
2nd	Sep. 58-Aug. 59	-	-	-	2nd	161 700	154 638	697 574	667 095	-	145	6.9
3rd	Sep. 59-Aug. 60	-	-	-	3rd	165 102	131 270	707 462	562 514	-	129	7.3
4th	Sep. 60-Apr. 62	-	-	-	4th	172 121	199 265	722 392	836 229	-	138	6.8
5th	May 62-Apr. 63	1st	175 622	174 779	-	(b)	1 101 ^{c)}	710 918	711 983	490	63	8.1
		2nd	182 784	184 355	-	(b)	1 192 ^{c)}	714 320	726 944	510	103	8.8
6th	May 63-Apr. 64	3rd	197 379	193 960	-	(b)	1 024 ^{c)}	733 060	724 166	477	77	8.9
		4th	205 165	176 912	-	(b)	1 268 ^{c)}	771 827	670 310.	455	71	9.3
7th	May 64-Jun. 65	5th	209 126	201 976	-	(b)	1 078 ^{c)}	750 420	728 633	440	77	9.0
		6th	206 495	183 650	-	(b)	1 332 ^{c)}	724 990	647 164	421	77	9.0
8th	Jul. 65-Jun. 66	7th	205 050	196 902	-	(b)	1 105 ^{c)}	730 020	701 266	421	73	8.8
		8th	211 390	193 629	-	(b)	...	710 101	654 648	416	71	7.4
9th	Jul. 66-Jun. 67	9th	215 450	196 258	-	(b)	1 250	720 552	664 620	428	83	7.5
		10th	217 620	197 700	-	(b)	-	761 670	712 459	432	-	8.0
10th	Jul. 67-Jun. 68	11th	201 950	194 832	-	(b)	-	706 825	649 039	431	-	8.3
		12th	205 148	168 479	-	(b)	-	759 048	584 220	436	-	7.5
11th	Jul. 68-Jun. 69	13th	207 214	165 285	-	(b)	-	766 692	563 486	423	-	7.0
		14th	208 154	183 546	-	(b)	-	749 354	644 757	434	-	7.6
12th	Jul. 69-Jun. 70	15th	215 369	196 003	-	(b)	-	755 945	757 402	495	-	7.1
		16th	208 281	203 098	-	(b)	-	757 402	775 191	472	-	7.7
13th	Jul. 70-Dec. 70	17th	189 385	187 414	1-2nd ^{d)}	-	39 316 ^{d)}	698 842	688 722	479	-	7.3

a) Estimated. b) Included in DDT column. c) Sprayed twice a year with 0.3 g/m². d) Quarterly cycles with DDT.



PANAMA (Cont.)

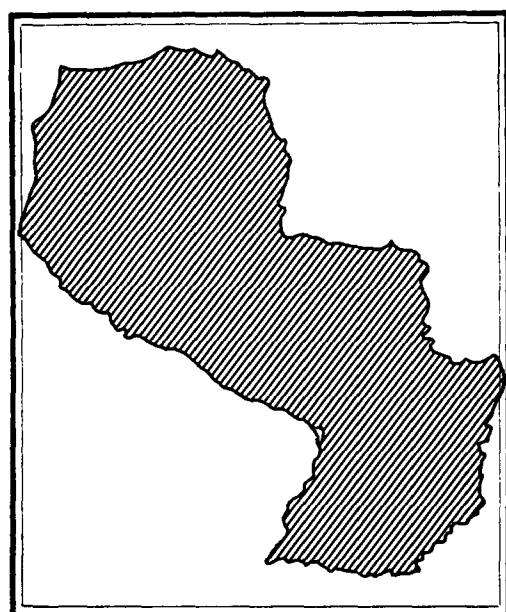
EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957a)	18 181	1 162	6.4	545	...	...
1958	91 933	6 067	6.6	1 461	4 537	69
1959	78 661	5 017	6.4	620	4 395	2
1960	77 099	4 463	5.8	670	3 792	1
1961	88 961	3 911	4.4	1 378	2 531	2
1962	145 012	3 249	2.2	631	2 618	-
1963	152 898	2 670	1.7	236	2 433	1
1964	131 887	1 804	1.4	101	1 703	-
1965	102 969	1 929	1.9	172	1 757	-
1966	97 525	3 664	3.8	919	2 744	1
1967	88 614	2 697	3.0	527	2 170	-
1968	83 211	1 625	2.0	495	1 130	-
1969	94 596	5 938	6.3	4 106	1 832	-
1970	237 477	4 584	1.9	3 402	1 182	-

a) August-December.

PARAGUAY

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>2 396</u>	<u>406 752</u>
Non malarious areas	<u>437</u>	<u>200</u>
Originally malarious areas		
Maintenance phase	<u>-</u>	<u>-</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>1 959</u>	<u>406 552</u>
Total originally malarious areas	<u>1 959</u>	<u>406 552</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	476	478
Evaluation operations	6	92	98
Administrative and other	1	61	62
Transport	-	97	97
Total	9	726	735

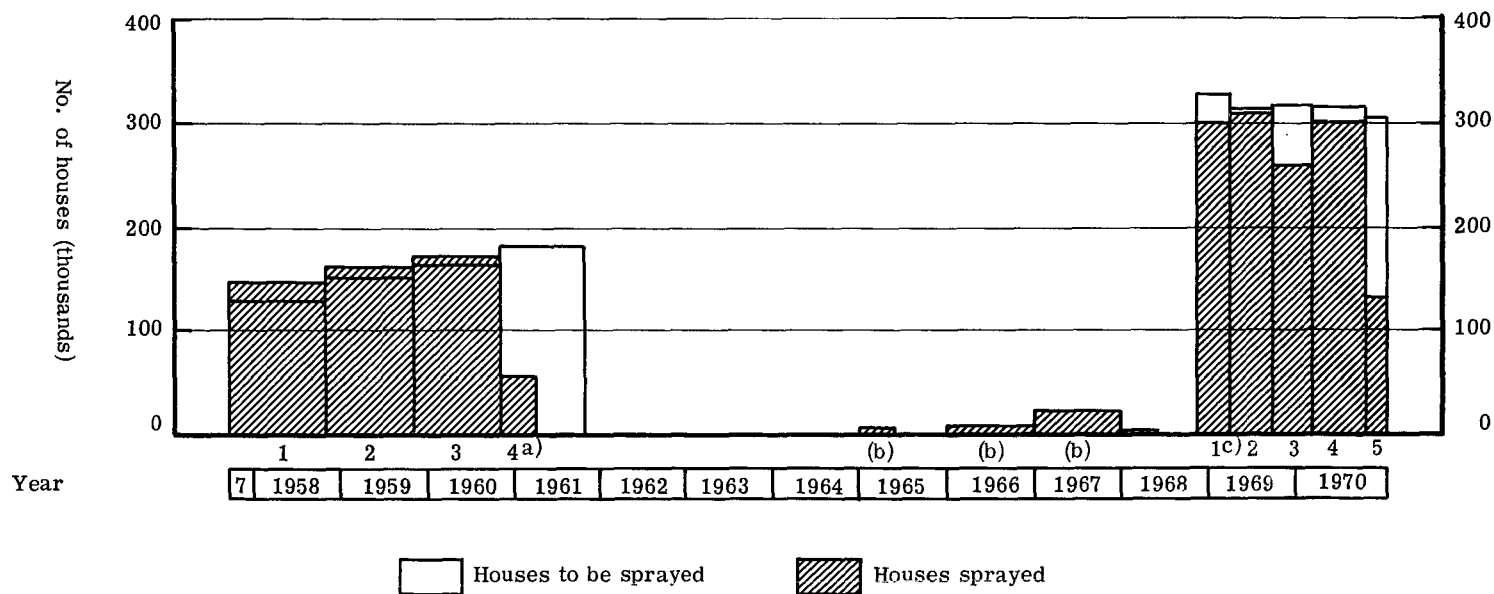
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	80	-	38	118
Two-wheel vehicles	-	40	-	40
Boats	7	7	7	21
Animals	-	-	-	-
Other	-	-	12	12
Total	87	47	57	191

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Nov. 57-Oct. 58	-	-	-	1st	126 902	148 626	638 190	747 541	-	105	10.9
2nd	Nov. 58-Oct. 59	-	-	-	2nd	150 033	161 261	749 115	805 232	-	111	14.3
3rd	Nov. 59-Oct. 60	-	-	-	3rd	163 586	171 086	807 460	844 515	-	118	11.7
4th ^{a)}	Nov. 60-Mar. 61	-	-	-	4th ^{a)}	181 097	56 656	898 060	280 982	-	138	8.1
(b)	Jan. 65-May. 65	-	-	-	-	-	5 709	-	27 213	-	129	6.6
(b)	Jan. 66-Dec. 66	-	-	-	-	-	6 993	-	55 614	-	126	6.9
(b)	Jan. 67-Dec. 67	-	-	12 359	-	-	1 519	...	70 227	534	134	6.7
1st ^{c)}	Oct. 68-Sep. 69	1st	330 000	304 100	-	-	-	1 500 000	1 384 606	472	-	8.2
		2nd	314 102	311 000	-	-	-	1 430 000	1 461 027	448	-	9.1
2nd	Oct. 69-Sep. 70	3rd	317 805	313 917	-	-	-	1 397 988	1 378 239	477	-	9.3
		4th	317 142	303 370	-	-	-	1 370 225	1 285 511	523	-	8.5
3rd	Oct. 70-Dec. 70	5th ^{d)}	308 357	131 586	-	-	-	1 286 295	579 416	534	-	8.7

a) Program suspended, new program being planned. b) Emergency spraying. c) New coverage started in October 1968. d) Cycle not yet finished.



PARAGUAY (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	14 359	526	3.7	...	...	...
1959	11 379	641	5.6	1	640	-
1960	47 045	1 165	2.5	5	1 159	1
1961	27 995	1 528	5.5	9	1 519	-
1962	48 184	5 756	11.9	313	5 443	-
1963	92 806	3 443	3.7	313	3 130	-
1964	103 169	8 851	8.6	961	7 889	1
1965	82 848	6 732	8.1	115	6 616	1
1966	131 293	33 026	25.1	717	32 309	-
1967	164 444	50 304	30.6	6 636	43 668	-
1968	113 770	20 743	18.2	794	19 949	-
1969	129 509	10 307	8.0	1 591	8 716	-
1970	157 587	1 429	0.9	155	1 274	-

PERU

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>13 587</u>	<u>1 285 216</u>
Non malarious areas	<u>8 850</u>	<u>324 045</u>
Originally malarious areas		
Maintenance phase	<u>1 299</u>	<u>195 818</u>
Consolidation phase	<u>2 283</u>	<u>221 930</u>
Attack phase	<u>1 155</u>	<u>543 423</u>
Total originally malarious areas	<u>4 737</u>	<u>961 171</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	4	241	245
Evaluation operations	14	350	364
Administrative and other	-	82	82
Transport	-	37	37
Total	18	710	728

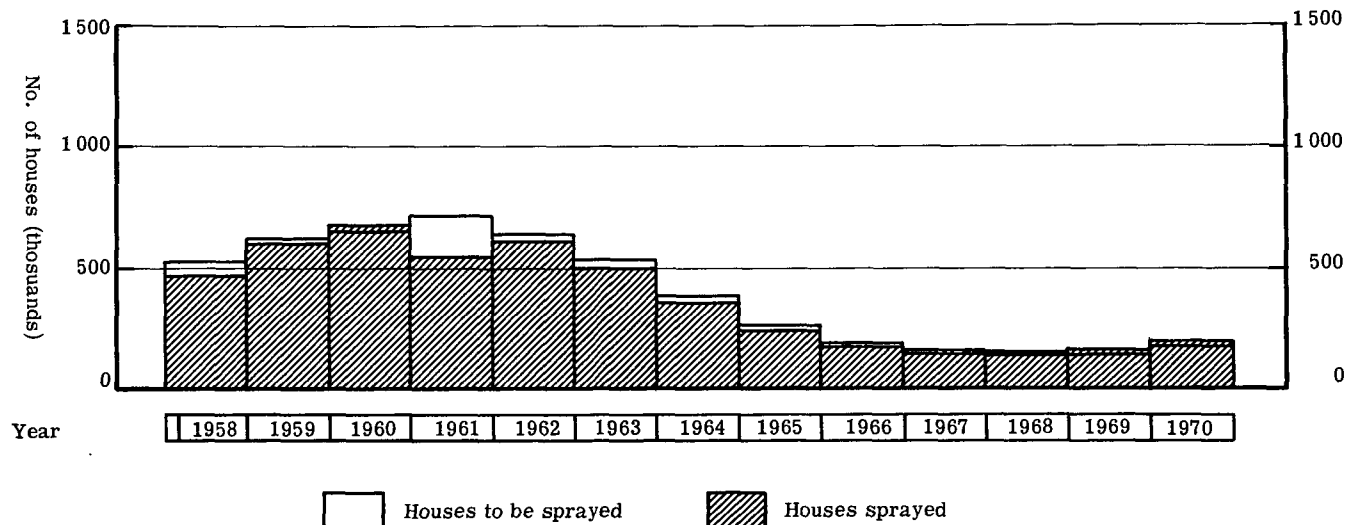
TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	12	53	64	129
Two-wheel vehicles	-	-	-	-
Boats	49	53	21	123
Animals	-	-	-	-
Other	-	-	-	-
Total	61	106	85	252

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	Nov. 57-Oct. 58	1st + 2nd	527 081	286 764 ^{a)} 79 266 ^{b)}	1st	(c)	122 120	2 054 035	1 867 208	426	115	7.8
2nd	Jan. 59-Dec. 59	(d)	637 241	271 065 ^{e)}	2nd	(c)	341 804	2 886 064	2 775 694	424	118	8.4
3rd	Jan. 60-Dec. 60	(d)	654 825	447 848 ^{e)}	3rd	(c)	234 643	3 209 952	3 345 726	468	95	8.4
4th	Jan. 61-Dec. 61	(d)	714 740	534 037 ^{e)}	4th	(c)	25 005	2 826 797	2 210 988	410	109	7.9
5th	Jan. 62-Dec. 62	(d)	646 992	627 527 ^{e)}	-	-	-	2 354 405	2 283 960	465	-	8.7
6th	Jan. 63-Dec. 63	(d)	537 112	500 218 ^{e)}	-	-	-	1 885 800	1 756 286	459	-	8.1
7th	Jan. 64-Dec. 64	(d)	357 805	379 184 ^{e)}	-	-	-	1 182 617	1 253 290	473	-	7.9
8th	Jan. 65-Dec. 65	(d)	264 319	240 003 ^{e)}	-	-	-	860 017	780 901	507	-	7.2
9th	Jan. 66-Dec. 66	(d)	190 613	186 109 ^{e)}	-	-	-	610 379	595 958	523	-	6.6
10th	Jan. 67-Dec. 67	(d)	169 436	162 433 ^{e)}	-	-	-	559 139	545 895	517	-	6.7
11th	Jan. 68-Dec. 68	(d)	150 780	153 893 ^{e)}	-	-	-	507 634	546 434	584	-	5.9
12th	Jan. 69-Dec. 69	(d)	167 469	173 975	-	-	-	611 117	601 630	506	-	6.3
13th	Jan. 70-Dec. 70	(d)	185 837	188 723 ^{f)}	-	-	-	643 223	681 203	521	-	6.2

a) Sprayed once a year. B) Sprayed twice a year. c) Included in DDT column. d) Owing to different spray cycle in timing in different regions, these data refer to calendar year. e) Sprayings. f) Includes houses sprayed in quarterly cycles.



PERU (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958a)	...	649b)	...	77	526	27
1959	148 413	4 658b)	3.1	302	4 265	51
1960	342 503	3 901	1.1	256	3 559	86
1961	403 748	3 055	0.8	185	2 804	66
1962	399 309	2 196	0.5	81	2 035	80
1963	313 649	1 630	0.5	101	1 389	140
1964	308 283	1 613	0.5	301	1 222	90
1965	280 449	1 508	0.5	113	1 315	80
1966	266 237	1 785	0.7	32	1 663	90
1967	198 340	2 689	1.4	105	2 512	72
1968	129 951	1 970	1.5	51	1 875	44
1969	143 052	2 850	2.0	22	2 791	37
1970	164 164	4 007	2.4	138	3 795	74

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>	
							from abroad	from areas within country							
1959	14	1 378	9.8	-	-	-	-	-	-	-	-	-	-	-	-
1960	15	7 277	48.5	5	-	-	1	-	4	-	-	-	1	4	-
1961	47	13 780	29.3	1	-	-	-	1	-	-	-	-	-	-	-
1962	864	71 330	8.3	20	2	1	1	12	4	-	-	1	16	3	-
1963	2 199	168 727	7.7	87	13	6	5	51	3	-	9	-	83	4	-
1964	2 204	186 205	8.4	321	209	45	-	25	2	3	37	1	316	4	-
1965	2 334	165 388	7.1	367	209	50	1	6	1	-	100	13	349	5	-
1966	1 962	138 634	7.1	233	87	39	-	14	1	-	92	-	233	-	-
1967	1 992	112 753	5.7	80	58	1	1	6	-	4	10	-	78	2	-
1968	2 184	85 336	3.9	34	10	6	1	9	1	-	7	1	31	2	-
1969	2 256	94 647	4.2	309	180	9	2	93	-	-	25	-	308	1	-
1970	2 283	112 392	4.9	253	155	9	-	73	-	3	13	-	252	1	-

a) November 1957-October 1958. b) Includes undifferentiated mixed infections.

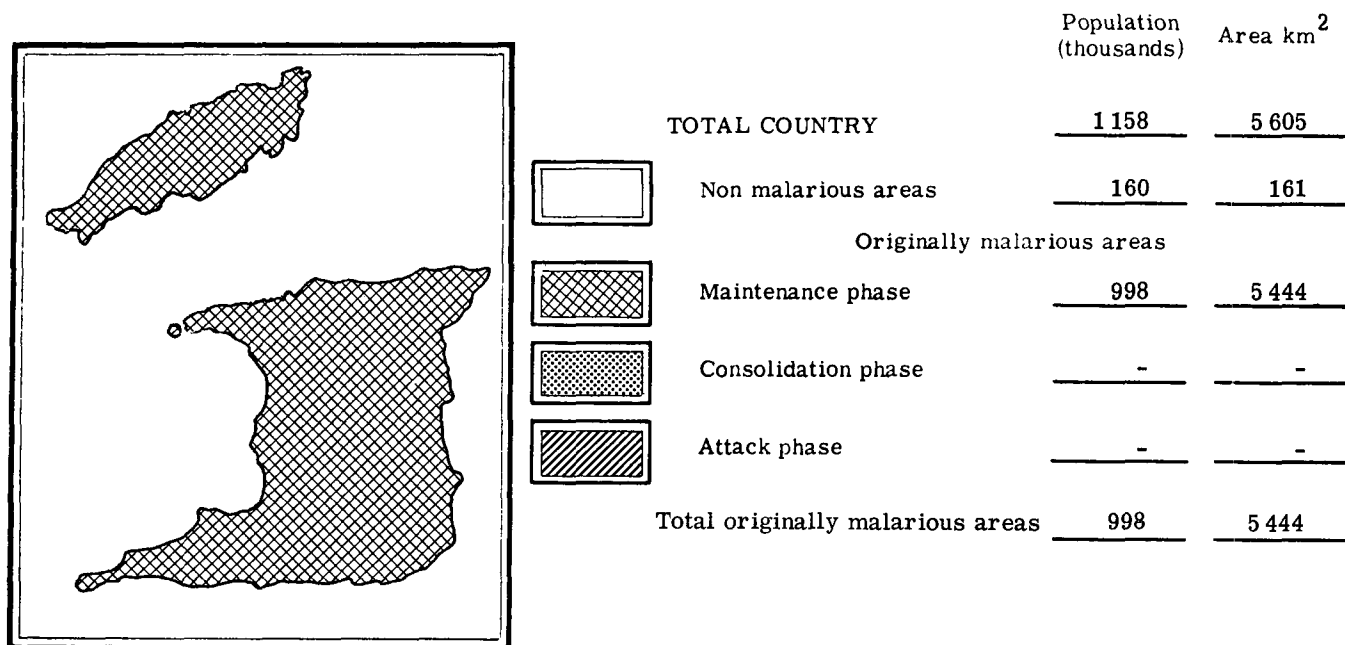
PERU (Cont.)

MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malar-</u> <u>iae</u>
							from abroad	from areas within country						
1963	43	8 581	20.0	4	-	-	1	1	2	-	-	-	2	2
1964	43	8 256	19.2	-	-	-	-	-	-	-	-	-	-	-
1965	46	6 260	13.6	2	-	-	-	-	2	-	-	-	-	2
1966	1 044	20 032	1.9	7	-	-	1	3	1	-	2	-	5	2
1967	1 058	30 738	2.9	3	-	-	-	2	1	-	-	-	1	2
1968	1 112	31 829	2.9	6	-	-	-	1	2	-	3	-	5	1
1969	1 133	25 645	2.3	9	2	-	4	-	1	-	2	-	7	2
1970	1 299	33 681	2.6	234	160	-	-	2	-	-	72	1	230	3

TRINIDAD AND TOBAGO

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	1	94	95
Evaluation operations	12	107	119
Administrative and other	2	47	49
Transport	-	15	15
Total	15	263	278

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	2	13	-	15
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	2	13	-	15

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	51 159	374	0.7	316	58	-
1959	101 039	92	0.1	63	28	1
1960	91 388	11	0.01	9	2	-
1961	89 569	-	-	-	-	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	160	21 279	13.2	2	-	-	2	-	-	-	-	2	-	-
1959	160	361	0.2	5	-	-	5	-	-	-	-	4	1	-
1960	185	17 612	9.5	2	-	-	2	-	-	-	-	1	1	-
1961	197	11 602	5.9	1	-	-	1	-	-	-	-	1	-	-
1962	877	120 967	13.8	1	-	-	1	-	-	-	-	-	1	-
1963	828	108 388	13.1	-	-	-	-	-	-	-	-	-	-	-
1964	822	82 038	10.0	3	-	1	2	-	-	-	-	-	1	2

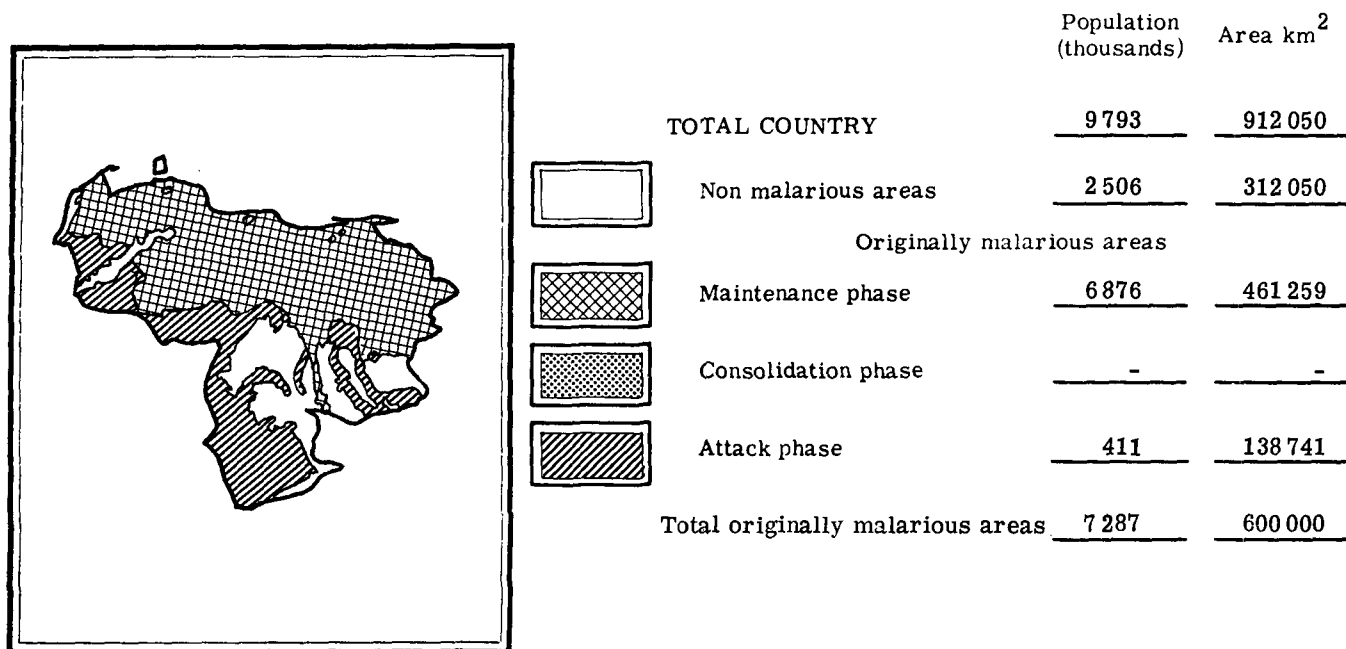
MAINTENANCE PHASE AREAS

1965a)	846	58 922a)	7.6	2	-	-	2	-	-	-	-	-	2	-	-
1966	872	89 156	10.2	40	38	1	1	-	-	-	-	-	1	-	39
1967	872	74 255	8.5	-	-	-	-	-	-	-	-	-	-	-	-
1968	885	65 757	7.4	5	-	1	4	-	-	-	-	-	4	-	1
1969	970	42 272	4.4	5	-	-	5b)	-	-	-	-	-	3	-	2
1970	998	25 301	2.5	1	-	1	-	-	-	-	-	-	-	-	1

a) January-November. b) One imported relapsing case.

VENEZUELA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	2	498	500
Evaluation operations	14	472	486
Administrative and other	(a)	(a)	(a)
Transport	-	35	35
Total	16	1 005	1 021

TRANSPORT FACILITIES

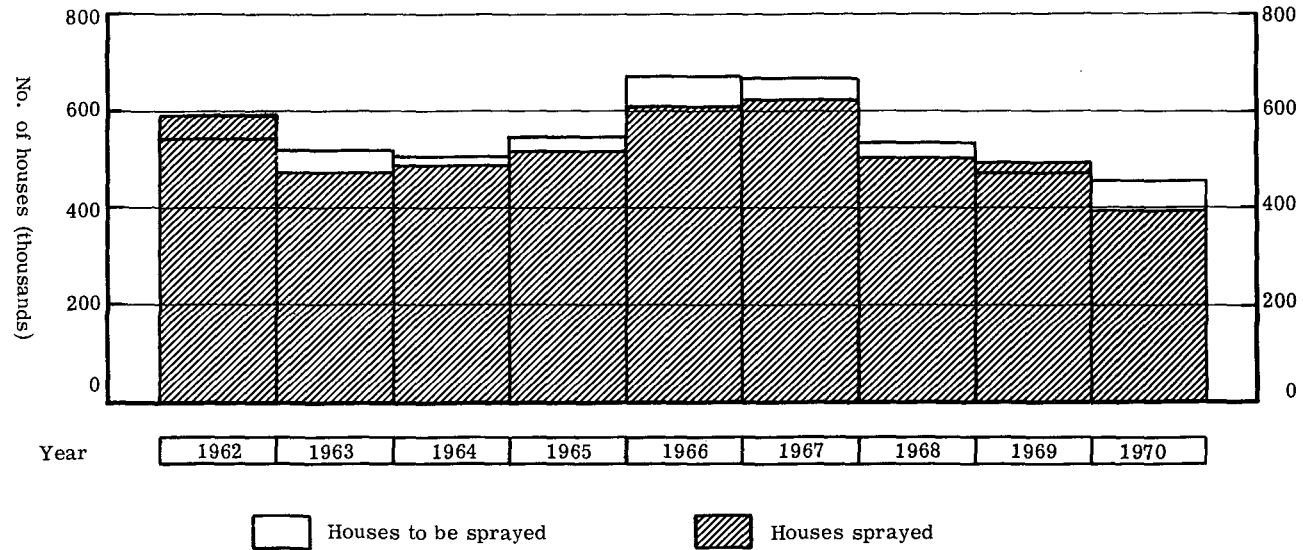
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	135	144	-	279
Two-wheel vehicles	36	315	-	351
Boats	36	88	-	124
Animals	312	335	-	647
Other	36 ^{b)}	-	-	36
Total	555	882	-	1 437

- a) Services performed by personnel of the "Dirección de Malaria y Saneamiento Ambiental" in charge of different programs of Environmental Sanitation.
b) Fogging machines.

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
...	Jan. 62-Dec. 62	...	595 757	510 287 ^{a)}	...	(b)	29 782	2 305 330	2 024 180	365	218	6.6
...	Jan. 63-Dec. 63	...	526 626	475 753 ^{a)}	...	(b)	4 112	2 155 390	1 964 197	368	274	7.0
...	Jan. 64-Dec. 64	...	505 250	490 884 ^{a)c)}	...	(b)	(b)	2 069 353 ^{d)}	2 010 565	384	...	7.3
...	Jan. 65-Dec. 65	...	553 218 ^{d)}	522 616 ^{a)c)}	-	-	-	2 279 763 ^{d)}	2 153 429	422	-	7.0
...	Jan. 66-Dec. 66	...	676 336	611 665 ^{a)c)}	-	-	-	2 825 556	2 554 844	399	-	6.7
...	Jan. 67-Dec. 67	...	675 556	623 926 ^{a)}	-	-	-	2 837 335	2 578 451	373	-	7.2
...	Jan. 68-Dec. 68	...	543 874	505 452 ^{a)}	-	-	-	...	2 039 352	465	-	6.3
...	Jan. 69-Dec. 69	...	477 090	492 476 ^{a)}	-	-	-	1 744 475	1 996 617	479	-	6.8
...	Jan. 70-Dec. 70	...	451 291	397 766 ^{a)}	-	-	-	1 789 893	1 610 726	884	-	5.8

a) Including houses sprayed twice, three and four times a year. b) Included in DDT column. c) Including houses sprayed with BHC or lindane. d) Estimated.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	269 448	975a)	0.4	60	901	4
1959	232 710	765a)	0.3	92	646	14
1960	247 429	1 346a)	0.5	165	1 163	6
1961	230 336	1 175a)	0.5	68	1 075	21
1962	172 280	883b)	0.5	53	812	14
1963	153 406	2 194b)	1.4	80	2 083	20
1964	141 977	3 948b)	2.8	451	3 486	4
1965c)	267 227	3 448	1.3	152	3 294	2
1966c)	294 602	3 935	1.3	465	3 431	39
1967	249 057	4 281	1.7	940	3 323	18
1968d)	201 568	5 555	2.8	1 511	3 989	55
1969	156 347	7 933	5.1	1 821	6 046	66
1970	90 764	12 392	13.7	1 606	10 770	16

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections						Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	469	69 614	14.8	50	-	-	27		-	23	-	2	46	2
1959	685	101 878	14.9	45	-	-	37		1	7	-	2	43	-
1960	291	93 047	32.0	112 ^{a)}	-	2	31	45	1	33	-	-	108	2
1961	174	64 923	37.3	57	-	4	15	9	-	29	-	-	57	-
1962	150	93 646	62.4	74 ^{a)}	-	1	29	7	-	37	-	22	51	-
1963	102	61 724	60.5	89 ^{a)}	-	-	32	7	-	50	-	26	62	-
1964	99	58 605	59.2	74	-	-	15	9	-	50	-	-	74	-
1965 ^{e)}	132	41 227 ^{e)}	41.6	20	-	-	11	3	-	6	-	10	10	-
1966 ^{e)}	67	31 766 ^{e)}	63.2	33	-	-	14	9	-	10	-	6	27	-
1967	37	27 772	75.1	34	-	-	16	2	-	16	-	3	31	-

a) Includes undifferentiated mixed infections. b) Includes undifferentiated mixed infections and unclassified species of parasites. c) Data for last quarter, not separated by phases. d) In 1968 areas in consolidation were reclassified to attack phase. e) January/September.

VENEZUELA (Cont.)

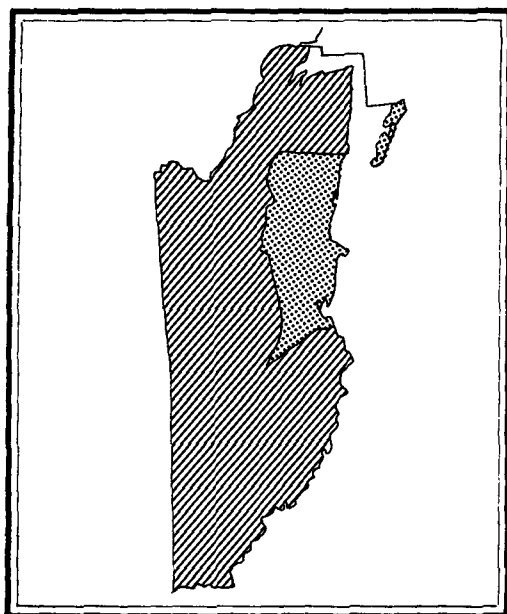
MAINTENANCE AND NON-MALARIOUS AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections						Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1958	4 720	145 654	3.1	113 ^{a)}	-	-	79		5	28	1	6	100	6
1959	5 097	169 189	3.3	101 ^{a)}	-	-	87		6	7	1	14	73	9
1960	6 092	224 193	3.7	216 ^{a)}	-	6	44	92	4	70	-	14	197	4
1961	7 111	305 252	4.3	522 ^{a)}	-	11	52	122	4	333	-	13	498	5
1962	7 410	282 314	3.8	253 ^{a)}	-	5	52	84	2	110	-	5	244	3
1963	7 701	284 814	3.7	570	-	-	79	286	3	202	-	6	562	2
1964	7 973	317 731	4.0	1862 ^{a)}	b)	1 ^{b)}	180 ^{b)}	1076 ^{b)}	1 ^{b)}	339 ^{b)}	-	12	1846	2
1965 ^{c)}	8 205	236 588 ^{c)}	3.8	1875	-	-	81	805	5	984	-	70	1780	25
1966 ^{c)}	8 500	274 727 ^{c)}	4.3	1502	-	-	110	802	1	588	1 ^{d)}	42	1454	6
1967	8 772	373 853	4.3	942	-	1	79	611	3	248	-	77	861	4
1968	6 545 ^{b)}	325 885 ^{b)}	5.0	180 ^{b)}	16 ^{b)}	-	42 ^{b)}	87 ^{b)}	2 ^{b)}	32 ^{b)}	1 ^{b)}	20 ^{b)}	155 ^{b)}	5 ^{b)}
1969	6 711 ^{b)}	311 811 ^{b)}	4.6	727 ^{b)}	104 ^{b)}	12 ^{b)}	151 ^{b)}	341 ^{b)}	3 ^{b)}	114 ^{b)}	2 ^{e)}	77 ^{b)}	647 ^{b)}	3 ^{b)}
1970	6 876 ^{b)}	180 710 ^{b)}	2.6	2 753 ^{b)}	633 ^{b)}	12 ^{b)}	264 ^{b)}	1 542 ^{b)}	4 ^{b)}	297 ^{b)}	1 ^{d)}	170 ^{b)}	2 580 ^{b)}	3 ^{b)}

a) Includes undifferentiated mixed infections. b) Maintenance phase only. c) January-September. d) Cryptic case. e) Cryptic cases.

BRITISH HONDURAS

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>120</u>	<u>22 965</u>
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	<u>50</u>	<u>4 307</u>
Attack phase	<u>70</u>	<u>18 658</u>
Total originally malarious areas	<u>120</u>	<u>22 965</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	19	19
Evaluation operations	(1)	12	12 (1)
Administrative and other	-	4	4
Transport	-	2	2
Total	(1)	37	37 (1)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	4	7	2	13
Two-wheel vehicles	-	-	2	2
Boats	-	5	4	9
Animals	-	-	-	-
Other	-	-	-	-
Total	4	12	8	24

(Part-time personnel in parentheses)

BRITISH HONDURAS (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Cycle DDT	Houses sprayed		Inhabitants directly protected		Insecticide used per house (g. technical) DDT	Average houses sprayed per spray-man/day
			Planned	Sprayed	Planned	Protected		
(a)	Jun. 66-Dec. 66	...	...	6 447	...	30 889	426	10.0
...	Ene. 67-Dec. 67	1st-2nd	...	15 820	...	48 213	399	7.6
...	Ene. 68-Jun. 68	3rd	10 720	10 297	70 450	45 167	463	7.5
	Ago. 68-Dec. 68	4th	10 720	5 375	70 450	24 802	489	6.8
...	Ene. 69-Dec. 69	5th	10 127	9 060	72 316	41 541	508	7.1
		6th	11 127	10 882	72 316	48 476	499	7.7
...	Feb. 70-Dec. 70	7th	11 127	11 443	72 316	50 000	421	8.5
		8th	11 735	7 772	70 030	34 433	475	8.2

a) New coverage started.

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1957	1 950	234	12.0	137	52	45
1958	4 374	288	6.6	117	147	24
1959	11 307	1 019	9.0	712	211	96
1960	13 307	196	1.5	55	138	3
1961	12 355	23	0.2	1	22	-
1962	7 895	2	0.03	-	2	-
1967a)	12 959	358	2.8	160	198	-
1968	10 690	39	0.4	1	38	-
1969	10 725	27	0.3	-	27	-
1970	12 697	28	0.2	-	28	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Au- tochtho- nous	Relaps- ing	Imported		Induced	Intro- duced	Not investi- gated and unclassi- fied	<u>P. falci- parum</u>	<u>P. vivax</u>	<u>P. malar- iae</u>
							from abroad	from areas within country						
1962 ^{b)}	100	6 661 ^{b)}	16.0	18	10	7	1	-	-	-	-	-	18	-
1963	100	13 085	13.1	17	17	-	-	-	-	-	-	-	17	-
1964	104	11 826	11.4	35	32	2	1	-	-	-	-	-	35	-
1965	105	10 787	10.3	206	200	-	4	-	-	-	2	188	18	-
1966	107	13 920	13.0	552	551	-	1	-	-	-	-	260	292	-
1967	46	1 814	3.9	17	8	-	2	6	-	-	1 ^{c)}	10	7	-
1968	48	1 581	3.3	-	-	-	-	-	-	-	-	-	-	-
1969	49	1 469	3.0	1	-	-	-	1	-	-	-	-	1	-
1970	50	2 825	5.7	5	3	1	1	-	-	-	1 ^{c)}	-	5	-

a) At the beginning of 1967 all areas were brought back to attack phase, with the exception of Belize District. b) August-December.

c) Cryptic case.

STATUS OF MALARIA PROGRAM AT DECEMBER 1970

CANAL ZONE



	Population (thousands)	Area km ²
TOTAL COUNTRY	51	1 432
Non malarious areas	-	-
Originally malarious areas		
Maintenance phase	-	-
Consolidation phase	51	1 432
Attack phase	-	-
Total originally malarious areas	51	1 432

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	(23)	(23)
Evaluation operations	-	(17)	(17)
Administrative and other	-	-	-
Transport	-	(4)	(4)
Total	-	(44)	(44)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	(2)	(2)
Two-wheel vehicles	-	-	-	-
Boats	-	-	(4)	(4)
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	(6)	(6)

(Figures in parentheses are to be considered as part-time)

CANAL ZONE (Cont.)

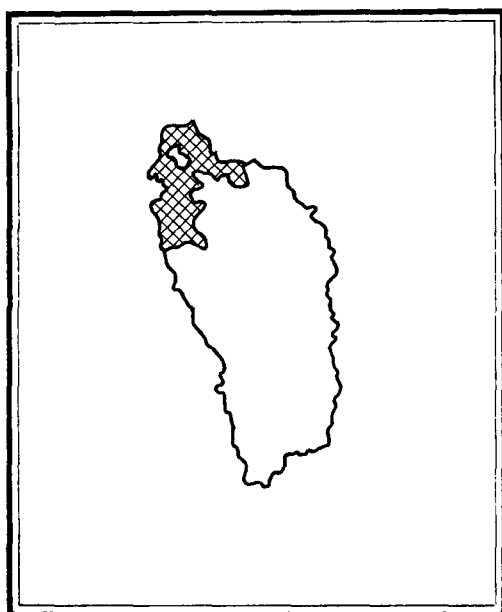
EPIDEMIOLOGICAL EVALUATION OPERATIONS, CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1960	41	2 656	6.5	27	27	-	-	-	-	-	-	3	24	-
1961	41	5 984	14.6	25	25	-	-	-	-	-	-	2	23	-
1962	44	677	1.5	18	18	-	-	-	-	-	-	-	18	-
1963	47	21 008	44.7	22	-	1	16	-	-	-	5	2	20	-
1964	50	26 228	52.5	21	7	3	1	10	-	-	-	-	21	-
1965	50	24 024	48.0	38	1	7	29	-	-	1	-	6	32	-
1966 ^{a)}	50	23 434 ^{a)}	51.1	71	26	4	41	-	-	-	-	1	70	-
1967	50	29 762	60.0	111	87	8	16	-	-	-	-	7	104	-
1968	50	22 367	44.7	89	70	8	10	-	-	-	-	5	84	-
1969	50	31 876	63.8	158	45	12	101	-	-	-	-	43	115	-
1970	51	35 462	69.5	57	16	2	39	-	-	-	-	35	22	-

a) January-November.

DOMINICA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>74</u>	<u>751</u>
Non malarious areas	<u>56</u>	<u>599</u>
Originally malarious areas		
Maintenance phase	<u>18</u>	<u>152</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>-</u>	<u>-</u>
Total originally malarious areas	<u>18</u>	<u>152</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	-	-
Transport	-	-	-
Total	-	-	-

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	-	-
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	-	-

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1959 ^{a)}	2 801	46	1.6	46	-	-
1960	6 151	6	0.1	6	-	-
1961	10 113	3	0.0	1	-	2
1962	13 373	0	-	-	-	-

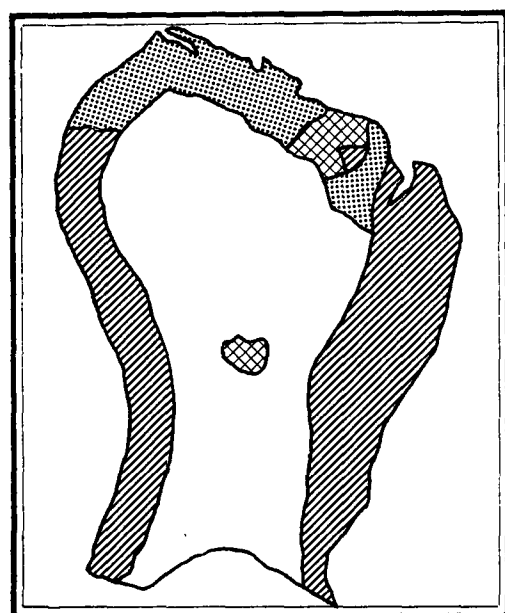
CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1963	14	16 775	119.8	-	-	-	-	-	-	-	-	-	-	-	-
1964	14	16 154	115.4	-	-	-	-	-	-	-	-	-	-	-	-
1965	15	9 894	66.0	-	-	-	-	-	-	-	-	-	-	-	-
MAINTENANCE PHASE AREAS															
1966	17	6 634	39.0	-	-	-	-	-	-	-	-	-	-	-	-
1967	18	3 571 ^{b)}	19.8	-	-	-	-	-	-	-	-	-	-	-	-
1968	18	5 197	28.9	-	-	-	-	-	-	-	-	-	-	-	-
1969	18	2 779	15.4	-	-	-	-	-	-	-	-	-	-	-	-
1970	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

a) June-December. b) Does not include information for July, August and September.

FRENCH GUIANA

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	45	90 000
Non malarious areas	-	67 500
Originally malarious areas		
Maintenance phase	27	2 000
Consolidation phase	15	7 500
Attack phase	3	13 000
Total originally malarious areas	45	22 500

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	79	79
Evaluation operations	1	6	7
Administrative and other	-	3	3
Transport	-	19	19
Total	1	107	108

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	10	10
Two-wheel vehicles	-	-	-	-
Boats	-	-	3	3
Animals	-	-	-	-
Other	-	-	6	6
Total	-	-	19	19

FRENCH GUIANA (Cont.)

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
...	Jan. 64-Dec. 64	...	2 137	1 972	...	8 912	2 326 ^{a)}	37 915	14 762	330	...	...
...	Jan. 65-Dec. 65	...	2 127	1 246	...	8 912	7 318 ^{a)}	...	...	253	...	...
...	Jan. 66-Dec. 66	...	2 117	2 500	...	8 912	6 932 ^{a)}	44 433	38 000	...	...	...
...	Feb. 67-Dec. 67	...	3 886	845	...	10 574	8 081 ^{a)}	...	...	...	...	...
...	Feb. 68-Dec. 68	...	3 000	2 977	...	11 000	10 487 ^{b)}	46 400	...	...	...	...
...	Feb. 69-Dec. 69	...	(c)	(c)	...	28 105 ^{c)}	26 861 ^{c)}	43 500	43 500	...	...	...
...	Feb. 70-Dec. 70	...	-	-	...	28 050	27 967 ^{c)}	45 000	45 000	...	...	...

a) Includes houses sprayed with DDT once a year, malathion and actidrine. b) Sprayed with malathion once a year. c) Includes houses sprayed with DDT, malathion and dieldrin.

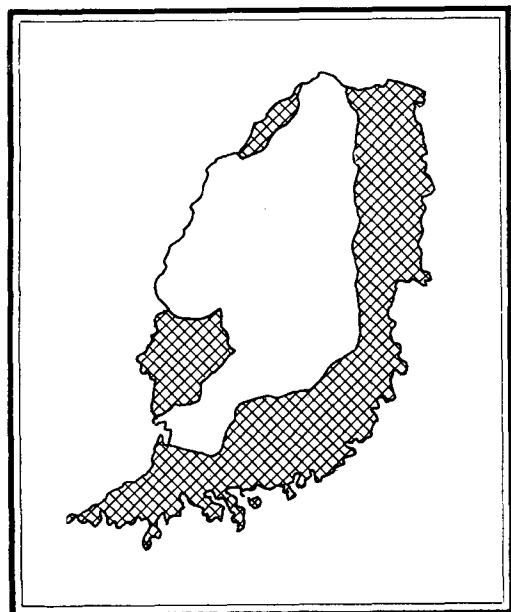
FRENCH GUIANA (Cont.)

EPIDEMIOLOGICAL EVALUATION OPERATIONS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1960	3 343	37	1.1	30	6	1
1961	1 197	33	2.8	33	-	-
1962	2 183	70	3.2	60	10	-
1963	2 648	70	2.6	61	9	-
1964	3 025	48	1.6	16	32	-
1965	5 424	22	0.4	15	7	-
1966	6 180	12	0.2	8	4	-
1967	9 811	25	0.3	19	6	-
1968	7 132	50	0.7	35	14	1
1969	7 000	52	0.7	20	32	-
1970	8 237	117	1.4	101	16	-

GRENADA AND CARRIACOU

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



Population (thousands) Area km²

TOTAL COUNTRY	106	342
Non malarious areas	70	239
Originally malarious areas		
Maintenance phase	36	103
Consolidation phase	-	-
Attack phase	-	-
Total originally malarious areas	36	103

(Island of Carriacou in Maintenance phase, not shown in the Map)

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	-	-
Transport	-	-	-
Total	-	-	-

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	-	-
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	-	-

GRENADA AND CARRIACOU (Cont.)

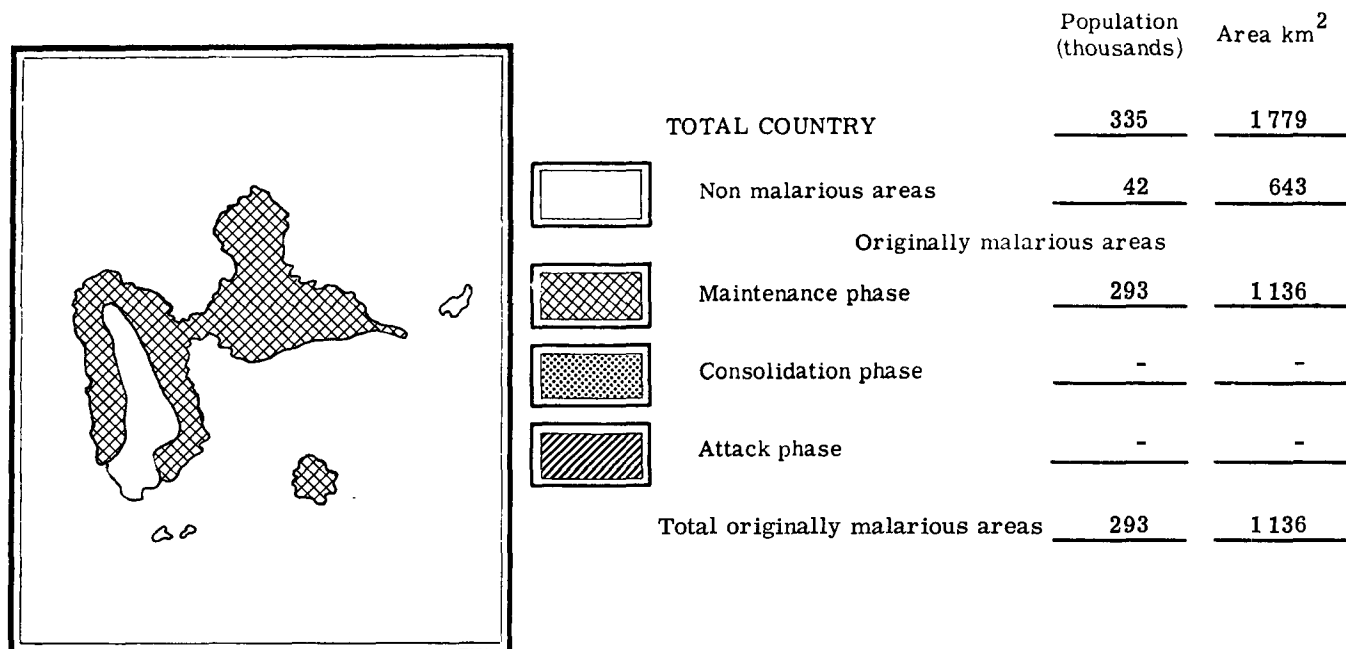
EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1962	37	1 996	5.4	-	-	-	-	-	-	-	-	-	-	-	-
1963	37	56	0.2	-	-	-	-	-	-	-	-	-	-	-	-
1964	39	517	1.3	-	-	-	-	-	-	-	-	-	-	-	-
1965	32	1 085	3.4	-	-	-	-	-	-	-	-	-	-	-	-
1966	32	1 263	3.9	-	-	-	-	-	-	-	-	-	-	-	-
1967	34	1 200	3.5	-	-	-	-	-	-	-	-	-	-	-	-
1968	34	218	0.6	-	-	-	-	-	-	-	-	-	-	-	-
1969 ^{a)}	36	980 ^{a)}	5.4	-	-	-	-	-	-	-	-	-	-	-	-
1970	36	644	1.8	-	-	-	-	-	-	-	-	-	-	-	-

a) January-June.

GUADELOUPE

STATUS OF MALARIA PROGRAM AT DECEMBER



PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	(2)	(7)	(9)
Administrative and other	-	-	-
Transport	-	-	-
Total	(2)	(7)	(9)

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	(3)	-	(3)
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	(3)	-	(3)

(Figures in parentheses are to be considered as part-time)

EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958	1 150	3	0.26	-	-	3
1959	3 903	-	0	-	-	-
1960 a)	4 450	2	0.04	...	...	...

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>	
							from abroad	from areas within country							
1958	129	4 887	3.8	-	-	-	-	-	-	-	-	-	-	-	-
1959	133	3 691	2.8	-	-	-	-	-	-	-	-	-	-	-	-
1960	145	7 080	4.9	-	-	-	-	-	-	-	-	-	-	-	-
1961	186	11 857	6.4	-	-	-	-	-	-	-	-	-	-	-	-
1962	66	11 196	17.0	-	-	-	-	-	-	-	-	-	-	-	-

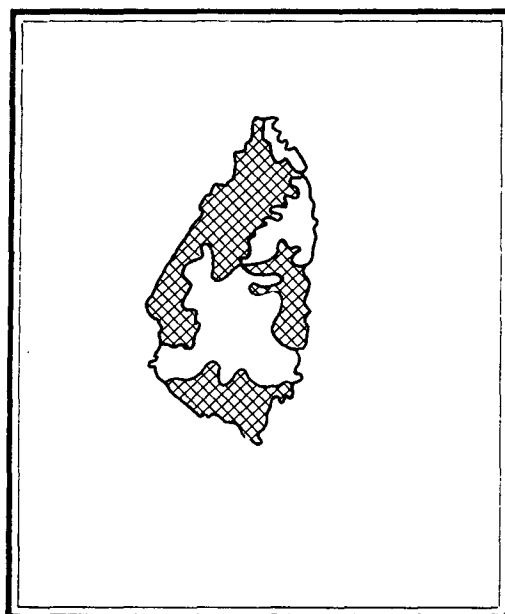
MAINTENANCE PHASE AREAS

1961	58	2 407	4.1	-	-	-	-	-	-	-	-	-	-	-	-
1962	187	5 239	2.8	-	-	-	-	-	-	-	-	-	-	-	-
1963a)	260	17 170a)	8.8	1	-	-	1	-	-	-	-	1	-	-	-
1964	298b)	21 831c)	7.3	-	-	-	-	-	-	-	-	-	-	-	-
1965	300b)	33 512c)	11.2	-	-	-	-	-	-	-	-	-	-	-	-
1966	312b)	32 022c)	10.3	-	-	-	-	-	-	-	-	-	-	-	-
1967	287	17 882c)	6.2	-	-	-	-	-	-	-	-	-	-	-	-
1968	289	14 018c)	4.9	-	-	-	-	-	-	-	-	-	-	-	-
1969	335b)	17 412c)	5.2	-	-	-	-	-	-	-	-	-	-	-	-
1970	335b)	56 215c)	16.8	-	-	-	-	-	-	-	-	-	-	-	-

a) January-September. b) Includes population of areas originally non-malarious. c) Includes slides taken in non-malarious areas.

ST. LUCIA

STATUS OF MALARIA PROGRAM AT DECEMBER



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>112</u>	<u>603</u>
Non malarious areas	<u>16</u>	<u>93</u>
Originally malarious areas		
Maintenance phase	<u>96</u>	<u>510</u>
Consolidation phase	<u>-</u>	<u>-</u>
Attack phase	<u>-</u>	<u>-</u>
Total originally malarious areas	<u>96</u>	<u>510</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	-	-
Evaluation operations	-	-	-
Administrative and other	-	-	-
Transport	-	-	-
Total	-	-	-

TRANSPORT FACILITIES

Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	-	-	-
Two-wheel vehicles	-	-	-	-
Boats	-	-	-	-
Animals	-	-	-	-
Other	-	-	-	-
Total	-	-	-	-

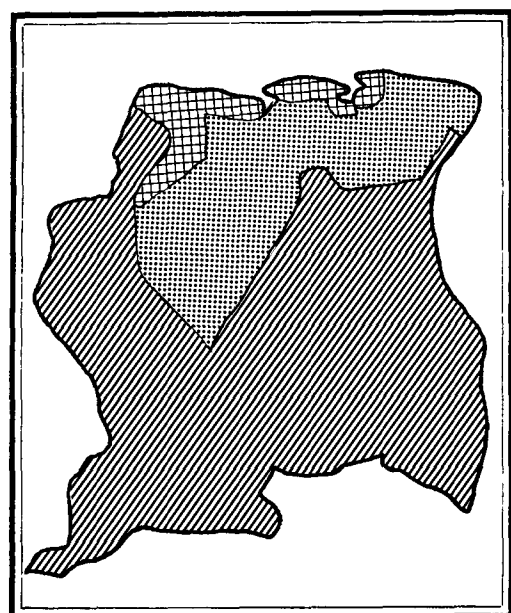
EPIDEMIOLOGICAL EVALUATION OPERATIONS, MAINTENANCE PHASE AREAS

Year	Estimated population in the area (thousands)	No. of slides examined	% of population sampled (annual rate)	Total No. of positive cases	Origin of infections							Species of parasite			
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falci-</u> <u>parum</u>	<u>P. vivax</u>	<u>P. malar-</u> <u>iae</u>	
							from abroad	from areas within country							
1962 ^{a)}	82	5 059 ^{a)}	24.7	-	-	-	-	-	-	-	-	-	-	-	-
1963	82	15 136	18.5	7	2	2	-	-	-	-	3 ^{b)}	-	-	7	-
1964	84	13 368	15.9	4	-	4	-	-	-	-	-	-	-	4	-
1965	87	11 201	12.9	-	-	-	-	-	-	-	-	-	-	-	-
1966	93	3 452	3.7	-	-	-	-	-	-	-	-	-	-	-	-
1967	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
1968	96	6 771	7.1	-	-	-	-	-	-	-	-	-	-	-	-
1969	96	12 048	12.6	-	-	-	-	-	-	-	-	-	-	-	-
1970	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

a) October-December. b) Uncertain origin.

SURINAM

STATUS OF MALARIA PROGRAM AT DECEMBER 1970



	Population (thousands)	Area km ²
TOTAL COUNTRY	<u>376</u>	<u>163 820</u>
Non malarious areas	<u>134</u>	<u>70</u>
Originally malarious areas		
Maintenance phase	<u>178</u>	<u>10 450</u>
Consolidation phase	<u>27</u>	<u>42 950</u>
Attack phase	<u>37</u>	<u>110 350</u>
Total originally malarious areas	<u>242</u>	<u>163 750</u>

PERSONNEL

Activity	Professional	Non professional	Total
Spraying operations	-	12	12
Evaluation operations	1	37	38
Administrative and other	-	24	24
Transport	-	82	82
Total	1	155	156

TRANSPORT FACILITIES

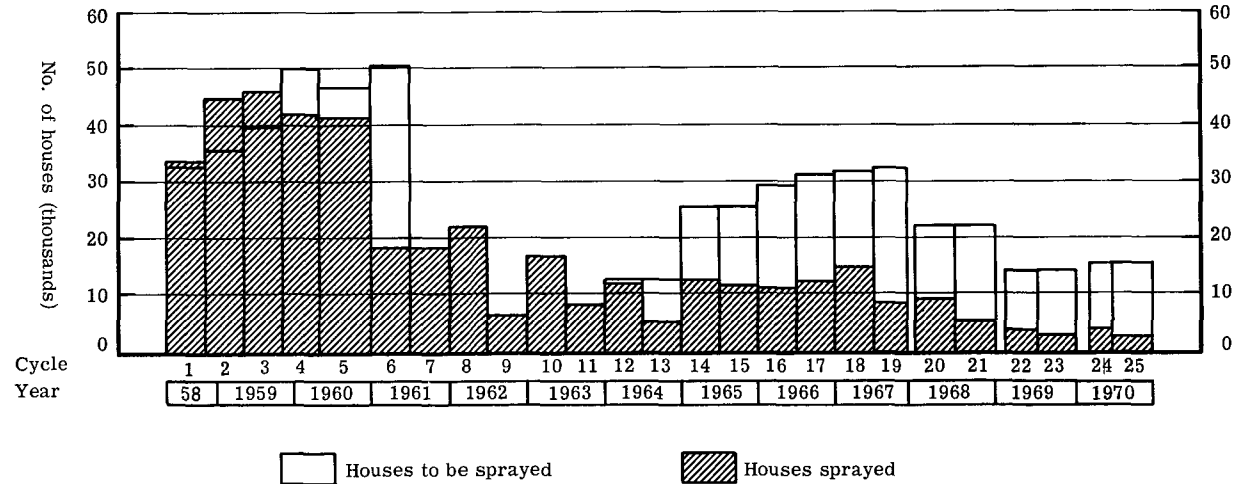
Type	Spraying Operations	Evaluation Operations	Mixed or other operations	Total
Four-wheel vehicles	-	3	10	13
Two-wheel vehicles	-	15	4	19
Boats	-	5	16	21
Animals	-	-	-	-
Other	-	10 ^{a)}	60 ^{a)}	70 ^{a)}
Total	-	33	90	123

a) Out-board motors.

SPRAYING OPERATIONS

Year of total coverage	Date	Houses sprayed						Inhabitants directly protected		Insecticide used per house (g. technical)		Average houses sprayed per spray-man/day
		DDT			Dieldrin			Planned	Protected	DDT	Dieldrin	
		Cycle	Planned	Sprayed	Cycle	Planned	Sprayed					
1st	May 58-Apr. 59	1st	32 722	31 299	1st	(a)	2 554	147 314	152 422	310	58	5.8
		2nd	35 540	40 211		(a)	4 930	150 334	190 951	318	60	6.9
2nd	May 59-Apr. 60	3rd	39 683	37 563	2nd	(a)	8 342	149 287	172 694	274	58	8.0
		4th	50 024	37 445		(a)	4 713	187 640	158 143	250	57	7.8
3rd	May 60-Jun. 61	5th	46 537	36 861	3rd	(a)	4 571	172 233	153 687	263	65	6.2
		6th	50 652	16 298		(a)	2 187	138 229	50 462	211	56	6.0
4th	Jul. 61-Jun. 62	7th	18 485	15 533	-	-	1 320	47 746	43 526	211	54	5.7
		8th	22 351	12 984		-	-	-	57 732 ^{b)}	33 537 ^{b)}	-	-
5th	Jul. 62-Jun. 63	9th	...	6 397	-	-	-	...	16 523 ^{b)}	-	-	...
		10th	...	16 681		-	-	-	...	42 558	-	-
6th	Jul. 63-Jun. 64	11th	...	8 458	-	-	-	...	19 164	-	-	...
		12th	12 824	5 603		1st	(a)	6 605	29 300	27 893	175	61	6.5
7th	Jul. 64-Jun. 65	13th	12 824	682	2nd	(a)	4 708	28 693	12 060	217	62	6.3
		14th	25 648	1 813		3rd	(a)	10 969	52 873	26 350	191	66	7.8
8th	Jul. 65-Jun. 66	15th	25 648	11 550	4th	(a)	(a)	58 279	25 260	...	...	...
		16th	29 486	1 488		5th	(a)	10 394	55 319	22 292	164	84	6.4
9th	Jul. 66-Jun. 67	17th	31 546	3 662	6th	(a)	8 975	73 953	29 625	161	76	6.3
		18th	31 950	3 320		7th	(a)	11 754	...	37 096	179	77	6.5
10th	Jul. 67-Jun. 68	19th	32 542	1 774	8th	(a)	6 837	...	16 239	149	73	6.3
		20th	22 406	2 277		9th	(a)	7 319	54 981	17 200	141	84	5.0
11th	Jul. 68-Jun. 69	21st	22 406	1 653	10th	(a)	4 033	54 981	9 719	169	77	5.1
		22nd	14 550	340		11th	(a)	3 595	36 250	3 314	181	65	5.3
12th	Jul. 69-Jun. 70	23rd	14 550	399	12th	(a)	2 898	36 250	2 202	220	61	6.1
		24th	15 400	250		13th	(a)	3 599	36 636	5 754	307	62	5.0
13th	Jul. 70-Dec. 70	25th	15 400	193	14th	(a)	2 477	36 636	4 831	328	84	4.4

a) Included in DDT column. b) Estimated.



EPIDEMIOLOGICAL EVALUATION OPERATIONS, ATTACK PHASE AREAS

Year	Slides examined			Species found		
	Total No.	Positive		<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
		Number	Percentage			
1958a)	23 137	2 288	9.9	2 220	48	20
1959	46 687	2 703	5.8	2 343	30	330
1960	45 396	997	2.2	912	3	82
1961	21 530	620	2.9	573	-	47
1962	18 794	694	3.7	676	-	18
1963	28 835	1 849	6.4	1 817	7	25
1964	23 186	1 643	7.1	1 615	4	24
1965	27 378	4 237	15.5	4 213	7	17
1966	28 374	2 882	10.2	2 831	8	43
1967	16 991	1 761	10.4	1 741	1	19
1968	22 284	1 530	6.9	1 517	1	12
1969	23 289	671	2.9	666	4	1
1970	22 892	935	4.1	925	10	-

CONSOLIDATION PHASE AREAS

Year	Estimated population in the area (thousands) (b)	No. of slides examined (c)	% of population sampled (annual rate)	Total No. of positive cases (c)	Origin of infections							Species of parasite		
					Autochthonous	Relapsing	Imported		Induced	Introduced	Not investigated and unclassified	<u>P. falciparum</u>	<u>P. vivax</u>	<u>P. malariae</u>
							from abroad	from areas within country						
1961	225	14 894	6.6	26	-	-	-	26	-	-	-	23	-	3
1962	240	19 025	7.9	22	-	1	-	21	-	-	-	17	-	5
1963	240	38 861	16.2	33	-	-	-	33	-	-	-	28	3	2
1964	253	53 369	21.1	38	-	-	-	38	-	-	-	35	1	2
1965	262	20 366	7.8	74	-	-	-	74	-	-	-	69	-	5
1966	277	7 411	2.7	51	-	-	-	49	-	-	2	47	3	1
1967	281	8 488	3.0	25	1	-	-	24	-	-	-	25	-	-
1968	303	13 055	4.3	25	-	-	4	17	-	-	4	24	1	-
1969	199 ^{d)}	14 905 ^{d)}	7.5	70 ^{d)}	22	1	-	15	-	4	28	68	2	-
1970	27	25 810	95.6	84	5	-	-	22	-	-	57	84	-	-

a) May-December. b) Includes the population of the city of Paramaribo, originally non-malarious area. c) Includes slides taken and positives found in Paramaribo, originally non-malarious area. d) Consolidation phase only.

II. SPECIAL TECHNICAL PROBLEMS

A. General status

The vector's physiological resistance to the commonly used insecticides continues to hinder the program's progress in some countries. This problem affects mainly Mexico, Guatemala, Honduras, El Salvador and Nicaragua; it also exists in Costa Rica and Haiti, but since it affects a very restricted area in each of these countries, it has been possible to successfully apply alternative measures. Indications of resistance in A. albimanus have been encountered in the cotton-growing regions of Cesar in Colombia.

Another problem--behavioral resistance of the vector--exists in areas of Western Venezuela and in the border regions of Colombia, where the vector is A. nuneztovari.

Table No. 21 outlines the most important technical problems affecting the programs, identifies the areas affected, their extent and population. Map No. 3 shows the location of these areas.

No changes were recorded in the known distribution of the chloroquine resistant P. falciparum strain. This resistance was again confirmed in areas already identified.

Factors relating to population dispersion, habits, migration, and human ecology in general, have influenced the status of the problem; because of these factors, it has been necessary to change the strategy in some countries; in the vast expanse of its Amazon Basin, Brazil adopted an open-ended program of eradication. Furthermore, the anthropological peculiarities of certain ethnic groups have hindered the application of residual-action insecticides in dwellings in the malarious area. Because of this problem, in the interior of Surinam, the coverage for these operations was less than 50 per cent of what had been planned; other measures, conversely, are acceptable to the population.

B. Activities for solving technical problems

1. Use of alternative insecticides

During the year plans were completed for the use of Propoxur in the Central American countries where the vector is resistant to dieldrin and DDT. Propoxur will be used under close supervision in areas with the highest incidence. It was used during the year in 236 localities in Nicaragua; its use will be expanded in parts of El Salvador, Honduras, and Guatemala, and in a small area in Costa Rica in 1971. In addition, in Venezuela an experimental project in the State of Barinas, where the vector is A. nuneztovari, was continued. The results of this project, which is being executed in the area where the vector displays behavioral resistance, will be compared with the results obtained in Central America where the vector A. albimanus shows physiological resistance to the above mentioned chlorinated insecticides.

2. Larviciding

Larviciding as a supplementary measure was again used in Nicaragua, Costa Rica, and Haiti, in foci where the vector is DDT-resistant.

3. Engineering works

No engineering works directly intended for malaria control were executed, but steps were taken to ensure better coordination of agencies responsible for works of this type and the health authorities, particularly with respect to the control of anophelines through water management. These activities will be continued in 1971. It is highly desirable to plan land reclamation schemes with the dual aim of improving the economy and reducing the malaria problem by means of long-range self-financing projects which are therefore eligible for support from agencies collaborating in development projects.

Table 21

COUNTRIES WITH AREAS WHERE SATISFACTORY PROGRESS HAS NOT BEING MADE DUE TO TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km ²	Insecticide		Principal vectors	Causes of problem	Attack measures		Measures planned for 1971
			Kind used	Years of coverage			Applied in 1970	Results obtained	
<u>Colombia</u> 1- Sarare Catatumbo Magdalena Medio	439 000	...	DDT	12	<u>A. darlingi</u> <u>A. nufieztovari</u>	Behavioristic resistance of <u>A. nufieztovari</u> ; migration, coloni- zation	Quarterly spraying with DDT in border- ing areas with Ve- nezuela; sem. in the remaining areas; focal mass admin.	Slight decrease in incidence	Same as in 1970
<u>El Salvador</u> 2- Departments of: Usu- lután, San Miguel, La Unión, Ahuachapan, Sonsonate, La Liber- tad, La Paz, San Vicente	501 032	6 600	DDT DLN	13 1	<u>A. albimanus</u>	DDT resistance; internal migration	Total coverage with DDT; mass drug adminis- tration	Transmission persists	Total coverage with DDT; mass drug administration; experimental spray. with Propoxur
<u>Guatemala</u> 3- Pacific coastal (20 municipalities)	431 695	6 419	DDT	12	<u>A. albimanus</u>	DDT resistance; migration of popu- lation; inadequate dwellings(without walls)	DDT spraying; mass drug ad- ministration to 10 000 inhabitants	Transmission persists	Quarterly spraying with Propoxur in an area with 228 000 inhabitants
4- Baja Verapaz (3 municipalities)	39 462	908	DDT	12	<u>A. albimanus</u>	Moderate resistance to DDT	DDT spraying; focal mass ad- ministration; focal antilarval campaign	Favorable	Same as in 1970
	471 157	7 327							
<u>Honduras</u> 5- Southern area	156 577	2 936	DDT DLN MAL	6 1 1 1/2	<u>A. albimanus</u> <u>A. pseudopunct.</u>	DDT resistance; migrations	Mass drug ad- ministration up to June	Transmission persists	Spraying with Propoxur

Table 21 (Cont.)

COUNTRIES WITH AREAS WHERE SATISFACTORY PROGRESS HAS NOT BEING MADE DUE TO TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km ²	Insecticide		Principal vectors	Causes of problem	Attack measures		Measures planned for 1971
			Kind used	Years of coverage			Applied in 1970	Results obtained	
<u>Honduras (Cont.)</u>									
6- Jamastran Valley	21 739	1 695	DDT DLN	11 1/2 1	<u>A. albimanus</u> <u>A. pseudopunct.</u>	DDT resistance; migrations	Mass drug admin. up to June; DDT spraying	Transmission persists	Spraying with Propoxur
7- Talanga and Cedros Valley	21 673	805	"	"	"	Moderate resistance to DDT	DDT spraying	"	"
	199 989	5 436							
<u>Mexico</u>									
8- Basins of Rivers Fuerte, Sinaloa, Hu- maya and Tamazola	307 319	16 927	DDT and DLN	14 1/2 ^{a)}	<u>A. pseudopunct.</u>	Internal migration; incipient resistance; poor housing; ag- gression of sprayed surfaces	Semestrial DDT spraying; treatment of malaria cases and colaterals (2nd semester)	Transmission persists	Same as in 1970 with increase in supervision
9- Huicot	105 633	27 323	"	"	"	Movements of popu- lation; poor housing aggress. of sprayed surfaces; temporary shelters	"	"	"
10- Basin of Balsas River	1 670 223	68 152	"	"	<u>A. pseudopunct.</u> <u>A. albimanus</u>	Aggress. of sprayed surfaces, intensive population movement, poor housing; partial resistance of <u>A.</u> <u>pseudopunctipennis</u>	"	"	Same as in 1970, with entomological studies to identify and measure vector resistance; experim. use of other insecti- cides

a) Irregular cycles and dosifications; in 1968 and 1969 only one spraying cycle was carried-out due to financial problems.

Table 21 (Cont.)

COUNTRIES WITH AREAS WHERE SATISFACTORY PROGRESS HAS NOT BEING MADE DUE TO TECHNICAL PROBLEM

Country and area	Population (area with problems)	Area Km ²	Insecticide		Principal vectors	Causes of problem	Attack measures		Measures planned for 1971
			Kind used	Years of coverage			Applied in 1970	Results obtained	
11- "Costa Chica" of Guerrero and Oaxaca coastal	595 389	45 389	DDT and DLN	14 1/2	<u>A. albimanus</u>	Aggress. of sprayed surfaces; poor housing; temporary shelters; modification of houses; incipient resistance	Semestrial DDT sprayings; treatment of cases and colaterals (2nd semester)	Transmission persists	Quarterly spraying with DDT; radical cure in localities with high incidence; treatments of cases and colat. ; fogging with insecticides; larviciding
12- El Itsmo	184 058	16 848	"	"	<u>A. pseudopunct.</u>	Population movements; poor housing; aggressions of sprayed surfaces	Semestrial DDT sprayings; case detection in all local. ; radical cure of cases and colat. during 2nd sem.	"	Increase of oper- ations and intensi- fication in super- vision
13- Tapachula-Suchiate	274 171	4 424	"	"	<u>A. pseudopunct.</u> <u>A. albimanus</u>	Partial resistance of <u>A. albimanus</u> to DDT; migration	Semestrial DDT sprayings; treatment of cases and colaterals (2nd semester)	"	Same as in 1970, with entom. studies to identify and measure resistance of <u>A. albimanus</u> ; es- tablishing of indicat. district with treat. of cases and colaterals fogging with insect.
14- Central part of Chiapas	134 486	9 246	"	"	<u>A. pseudopunct.</u>	Population movements; area with difficult accessi- bility; aggress. of sprayed surfaces	"	"	Same as in 1970 and intensification in supervision

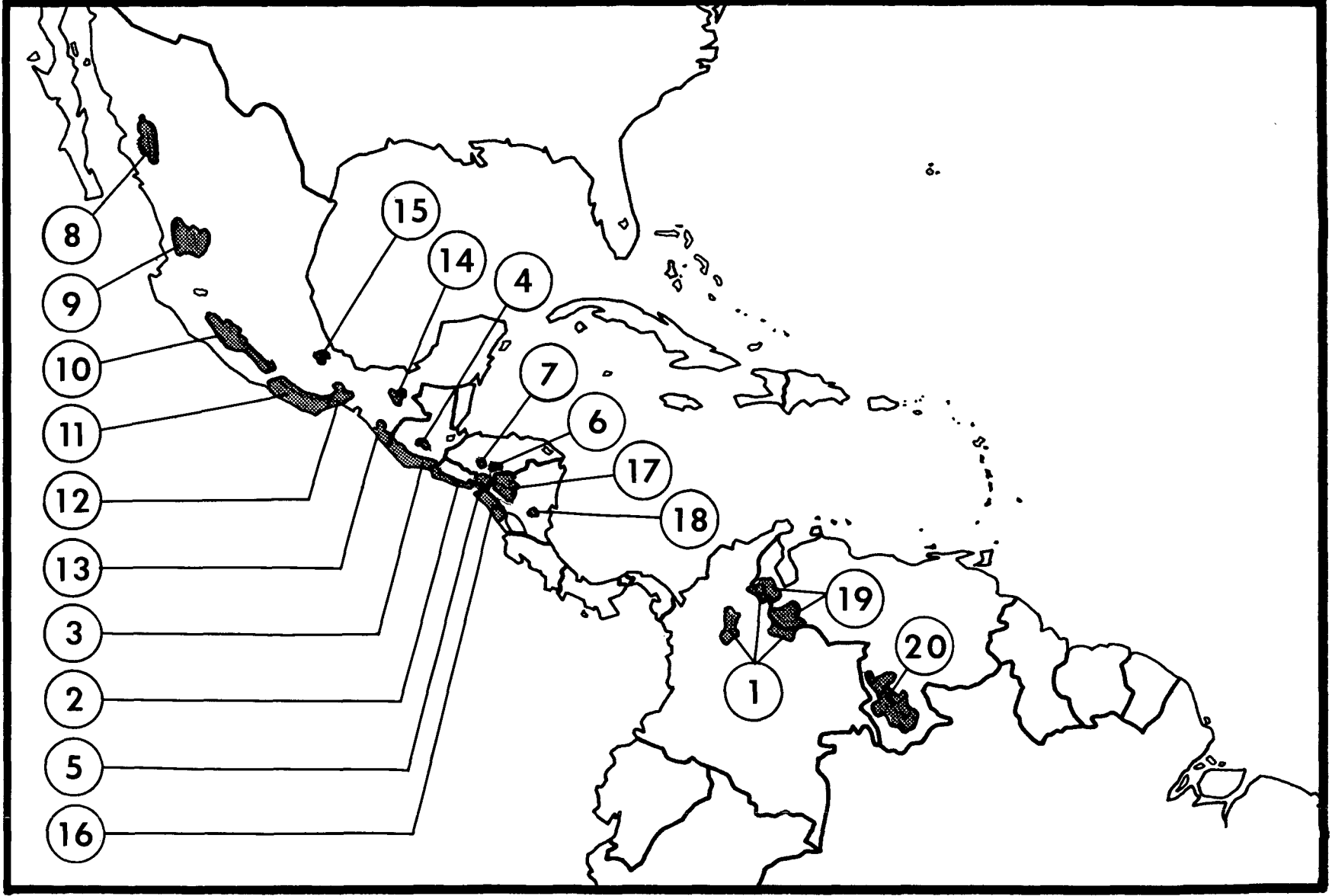
Table 21 (Cont.)

COUNTRIES WITH AREAS WHERE SATISFACTORY PROGRESS HAS NOT BEING MADE DUE TO TECHNICAL PROBLEMS

Country and area	Population (area with problems)	Area Km ²	Insecticide		Principal vectors	Causes of problem	Attack measures		Measures planned for 1971
			Kind used	Years of coverage			Applied in 1970	Results obtained	
15- Basin media of Papaloapan River (Miguel Aleman Dam)	274 881	15 649	DDT and DLN	14 1/2	<u>A. pseudopunct.</u> <u>A. albimanus</u>	Population movements; temporary shelters	Semestrial DDT sprayings; treatment of cases and colaterals during 2nd sem.	Transmission persists	General operations increase, and intensification in supervision
	3 546 160	203 895							
<u>Nicaragua</u> 16- Pacific Region	407 710	15 713	DDT MAL Pro- poxur	4 4 3/4	<u>A. albimanus</u>	Resistance to DDT and Malathion	Quarterly spraying with Propoxur (3 cycles)	Good	Quarterly spraying with Propoxur; 4 cycles in some local. and 2 in others
17- Central Region	271 350	9 462	DDT MAL Pro- poxur	4 5 1/2	"	Resistance to DDT	Quarterly spraying with Propoxur (2 cycles)	In observation	"
18- Atlantic Region	5 760	150	DDT MAL Pro- poxur	4 1 1/2	"	"	"	"	"
	684 820	25 325							
<u>Venezuela</u> 19- Occidental malarious area	353 049	18 533	DDT	20	<u>A. nufesztovari</u>	Behavioristic resistance	Quarterly spray. with DDT; focal chemotherapy	Transmission persists	Same as in 1970 and pilot project with Propoxur
20- Southern malarious area	57 951	120 208	DDT	15	<u>A. darlingi</u>	Nomadic habits of population in sylvan environment; primitive shelters	DDT spraying every 3 months, focal chemotherapy	"	Intensification in application of attack measures
	411 000	138 741							

MAP 3

GEOGRAPHICAL DISTRIBUTION OF AREAS WITH PERSISTENT TRANSMISSION (SHOWN IN TABLE 21)



4. Mass drug administration

In 1970, mass drug distribution was used to a lesser extent than in previous years. This measure was used in Bolivia, Colombia, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama and Peru. Experience indicates that it is a desirable and efficient measure for controlling epidemic situations; for terminating small residual foci; and in general, for reducing the number of cases, and that its suspension leads to a resurgence of incidence if the area has not been subjected to other measures against the vector. On the other hand, this measure ran into various problems, both technical, as in the case of the resistance of *P. falciparum* infections to the 4-aminoquinolines in certain areas, and operational, which are more frequent and result in defective coverage. For these reasons mass drug administration is not to be considered an effective means of eradicating malaria in extensive areas, but has been used and should continue to be used in special circumstances.

In 1970, mass drug treatment was administered to 858,056 persons, as shown in Table No. 22. This activity was carried out primarily in Central American countries, in periodic 14-day cycles; in Bolivia a combination of three drugs was used, distributed over three days, in two-month cycles; in Peru a similar combination was used in monthly cycles. The drugs used in the different treatment schedules were chloroquine, primaquine and pyrimethamine. The lowest percentage of coverage was attained on the southern coast of Guatemala (41.8 per cent) and the highest percentages of coverage in Costa Rica (Rio Claro and Sierpe) 97.7 per cent, and in Panama in Baru, 92.0 per cent. The results are shown in Table No. 22; the reduction in the incidence in Colombia, Costa Rica, and certain areas of Peru is noteworthy.

Kitchen salt mixed with chloroquine or amodiaquine continued to be distributed in the interior in French Guiana, Guyana, and Surinam, to a total population of 76,000 inhabitants. During the year, 428,600 pounds of medicated salt were distributed to this population, an average of 5.64 pounds per person. The results obtained in French Guiana were highly satisfactory. In Guyana transmission was interrupted, and distribution was accordingly suspended at year's end, except in certain border localities where it was continued to prevent reintroduction of the disease. In Surinam the results were not so clearcut, owing to certain defects in the first half of the year, which prevented proper distribution to the population.

Under present conditions medicated salt is considered to be the most indicated measure for interrupting the transmission of malaria in these three countries.

Table 22

MASS DRUG PROGRAMS IN THE AMERICAS, 31 DECEMBER, 1970

Country and name of area	Population	Area Km ²	Drug used	Drug cycle	Number of cycles 31 Dec. 1970	Population treated (percentage)	Slides examined	Positive cases		
								<u>P. falciparum</u>	<u>P. vivax</u>	Total
<u>Bolivia</u> Tarija	20 330	16 248	Chloroquine + Primaquine + Pyrimethamine	60 days	2	60.0	15 261	-	21	21
<u>Colombia</u> Bajo Cauca Catatumbo Sarare Total	24 331 7 502 10 566 42 399	4 500 1 200 1 400	Chloroquine + Pyrimethamine	14 days	27 5 5	79.4 73.2 72.1	1 859 336 527	32 20 25	24 4 3	56 24 28
<u>Costa Rica</u> Paquera Bejuco Rio Claro Sierpe Total	1 714 2 769 3 896 2 407 10 786	51 175 85 112	Chloroquine + Primaquine	14 days	36 22 33 17	93.7 92.9 97.7 97.8	2 732 3 816 6 996 3 236	- - - ...	- 2 2 ...	- 2 2 6
<u>El Salvador</u>	344 398	3 678	Chloroquine + Primaquine	14 days	18	61.0	44 043	227	3 403	3 630

Table 22 (Cont.)

MASS DRUG PROGRAMS IN THE AMERICAS, 31 DECEMBER, 1970

Country and name of area	Population	Area Km ²	Drug used	Drug cycle	Number of cycles 31 Dec.1970	Population treated (percentage)	Slides examined	Positive cases		
								<u>P. falciparum</u>	<u>P. vivax</u>	Total
<u>Guatemala</u>										
Costa Sur	108 310	5 500	+ Chloroquine Primaquine	14 days	22	41.8	8 441	-	330	330
Alta Verapaz	18 004	400			22	85.9	3 788	-	166	166
Total	126 314									
<u>Honduras</u>										
District I	15 759	364	+ Chloroquine Primaquine	14 days	130	46.5	3 961	18	532	550
District II	16 197	377			80	34.8	1 105	1	122	123
District III	23 829	584			76	38.1	1 496	2	315	317
District IV	29 149	729			71	41.9	2 082	11	141	152
District V	24 437	1 138			71	40.3	2 212	4	446	450
District VI	15 551	169			43	78.7	2 353	4	77	81
Total	124 922									
<u>Nicaragua</u>										
	107 764	...	+ Chloroquine Primaquine	14 days	8	42.2	13 358	...	...	825
<u>Panama</u>										
Baru	23 558	900	+ Chloroquine Primaquine	14 days	7	92.0	4 572	-	-	-
Lago Gatun	4 531	200			23	87.0	2 043	56	-	56
Total	28 089									
<u>Peru</u>										
Zone I - II	26 638	10 860	Chloroquine + Primaquine + Pyrimetha- mine	Monthly	3	81.4	6 118	...	...	...
Zone III	4 045	5 700			3	78.2	7 384	15 ^{a)}	54	69
Zone VII	22 371	15 290			3	82.6	1 570	6 ^{a)}	-	6
Total	53 054									

a) P. malariae

III. RESEARCH

The research program of the Department of Malaria Eradication continues as in previous years to be aimed at the solution of the problems that have hindered the progress of the programs in the countries.

Liaison has also been maintained with other agencies engaged in research and the efforts of the countries to investigate, and find solutions to their problems, have been coordinated and oriented.

These activities have included:

A. Evaluation of insecticides

1. Evaluation of Propoxur (OMS-33)

Following completion of the large-scale field trial of Propoxur in the Department of La Unión (El Salvador), which demonstrated the remarkable effectiveness of this insecticide, it began to be applied in Nicaragua and El Salvador in the areas where the problem of the persistence of transmission is considered most acute. Its use will be the subject of very careful evaluation designed to identify situations in which the insecticide by itself is incapable of interrupting transmission.

2. Technique of partial spraying of dwellings with Propoxur (OMS-33)

In February 1971, a field trial was begun to ascertain whether, because of the fumigant effect of this insecticide, a sufficient effect could be achieved by spraying only a small portion of the interior surface of dwellings in shorter cycles.

For this experiment an area was selected in the Department of La Paz in El Salvador, containing 6,576 dwellings and approximately 30,000 inhabitants, in which malaria transmission due to DDT and dieldrin resistant A. albimanus persists. The method of spraying used is to apply an average of 60 g. of active substance every 35 days, using normal technique, to a portion of the roof and the angle between the roof and wall. Special attention is given to wood or straw surfaces because of the insecticide's longer persistence on them; surfaces of adobe, particularly plastered and white-washed adobe, zinc roofs and others, where the insecticide is more likely to be deactivated or eliminated, are avoided.

The first year's results are highly promising and seem to indicate that under the conditions existing in the area this method may be as effective as complete sprayings in three-month cycles and better than mass drug administration. However, because of the intensive movement of the population, the small extent of the experimental area, the previous use of mass chemotherapy and continued use of drugs in adjacent areas, epidemiological evaluation is difficult, and observations must be continued for at least one more year to ensure proper evaluation.

3. Ultra-low-volume application of insecticide

In cooperation with the National Malaria Eradication Service (NMES) of Panama and various agencies of the United States Government, a preliminary plan was prepared for a study on the feasibility of preventing malaria transmission by means of the aerial spraying on insecticides in certain problem areas.

B. Investigation in Chemotherapy

1. Response of P. falciparum to chloroquine

In Brazil, evaluation of the "in vitro" method of determining the susceptibility of P. falciparum to chloroquine was continued.

In order to determine the limits of the reaction between susceptible and resistant strains, however, it is deemed necessary to use this method in an area where a natural susceptible reaction can be expected. A study has been planned in Haiti for 1971.

2. Mass radical treatment for the elimination of residual malaria foci

In September 1970, an experimental project was initiated in the Zone of Tarija, in Bolivia, covering areas with a population of 16,445 inhabitants. This project will make it possible to evaluate the curative effect of a combination of three drugs, chloroquine, primaquine and pyrimethamine, administered over a period of three days, at 60-day intervals, in eliminating foci. This project ended in March 1971 but it is still too soon to evaluate the results.

C. Entomological studies

1. Vector behavior

Behavioral studies of different vectors, particularly A. albimanus and A. nuñeztovari, in the malaria eradication programs in Haiti, Nicaragua, Brazil and Venezuela, were continued. Particular attention was devoted to this aspect in the AMRO-0216 Project in El Salvador, especially the factors affecting contact between vector and insecticide and between vector and man.

2. Vector genetics

With the assistance of PAHO the studies that begun in South America by Prof. J. B. Kitzmiller of the University of Illinois have continued, and the chromosomic map of A. aquasalis, A. albimanus, and A. oswaldoi, and the X chromosomes of A. nuñeztovari, A. darlingi and A. triannulatus was completed; differences between specimens of A. nuñeztovari originating in Tibó, Colombia, and in Manaus, Brazil, have also been observed and are still being studied by Prof. Kitzmiller.

3. Vector susceptibility to insecticides

Research on the susceptibility of vectors to insecticides has continued to be a basic activity of the programs.

In restricted area of the Rio Viejo Valley in Nicaragua it was discovered that A. albimanus showed reduced susceptibility to Propoxur. This area of abnormal susceptibility seems to be restricted to the Valley in question, where Carbaryl (Sevin) has been used for several years in the extensive rice fields. The vectors in this area are susceptible to Malathion, and its use has accordingly been recommended.

Numerous tests of susceptibility to Propoxur in the area of the Pacific Coast demonstrate complete susceptibility. In this area, which is the principal problem of all the Central American countries, the principal crop is cotton, for which, apparently, Carbaryl is not used.

A study of the development of resistance to this insecticide and the possibility of cross resistance to other carbamate and organophosphorus insecticides has been planned.

D. Investigation of the economic effects of malaria

The purpose of this project is to measure the economic impact of malaria on families of farmers and selected rural undertakings, by a comparative study of all aspects of their economic activities when affected and when not affected by malaria.

Field activities of the project were begun in August 1968 and continued up to the first half of 1970, when the information obtained was tabulated and analyzed.

Up to December 1970, the general information based on longitudinal studies had been compiled for 314 families; this information was being coded for subsequent analysis. A computer program was designed, relating the observations with health indices and particularly with malaria. The results of the studies are expected to be available in the second half of 1971.

E. Research promotion

With a view to making more effective use of the results of research in the various fields related to malaria, encouraging contacts and exchanges of ideas between research workers and key personnel of the eradication programs, an "Inter-American Symposium on Malaria Research" has been planned in cooperation with the Government of El Salvador and the CDC/USPHS. It is hoped to hold this Symposium in 1971.

IV. INTERNATIONAL COOPERATION

Table No. 23 shows, by categories, the international officials assigned to the malaria eradication campaigns in the Hemisphere. The personnel of the inter-zonal and inter-country projects strengthen the technical aspects of the work of the personnel assigned to the countries and endeavor to establish close coordination among them, particularly in Central America. Also included are research projects on better methods of campaign execution.

Table No. 24 shows the drugs provided by PAHO from 1958 to 1970. They consist primarily of antimalarial drugs for the presumptive treatment of febrile cases that attend information posts, and for radical cure treatment of confirmed cases. Drugs to be added to salt are supplied to those programs which apply this measure. Aspirin is also supplied to certain programs with areas in consolidation or maintenance phase, as an incentive to induce febrile cases to come in for blood tests. During the year a limited amount of Fansil (Sulfadoxine) was supplied to those programs in which *P. falciparum* infections do not respond to chloroquine treatment. This medicine is used in combination with pyrimethamine only after confirmation of parasite resistance to chloroquine.

In addition to the above-mentioned drugs PAHO provided a number of vehicles, equipment, and such supplies as cardboard tubes for mailing slides, equipment for entomological tests, and similar articles.

There is no center for the training of malaria eradication personnel in the Americas directly sponsored by PAHO/WHO; however, an international course for which the Government offers six fellowships to candidates selected by PAHO/WHO, is held each year in the "Escuela de Malariología y Saneamiento Ambiental" in Maracay, Venezuela. The cost of travel from their countries to Venezuela of these six fellows is defrayed by PAHO, which also provides complete fellowship assistance to the trainees exceeding the number of fellowships offered by the Government. PAHO sent eleven trainees to the 1969-1970 course, (Bolivia 1, Colombia 3, Ecuador 1, El Salvador 2, Guatemala 1, Haiti 1, and Honduras 2) and selected nine for the 1970-1971 course (Brazil 2, Colombia 5, Ecuador 1 and Haiti 1).

Table 25 shows, project by project, the contributions of PAHO, WHO, UNICEF and USAID. The outlays of PAHO and WHO for malaria eradication in the Americas during 1970 together totaled \$2,422,677 or 92.9 per cent of the amount contributed in 1969. UNICEF contributed \$1,658,000 (including freight costs), or 66.6 per cent of its 1969 contribution. USAID gave grants to five programs and covered inter-country project personnel and research costs totaling \$726,618, or 31.5 per cent of its 1969 contribution. USAID also gave assistance to malaria programs in the form of long-term, low-interest loans, which are itemized in Table No. 19.

Table 25 also shows estimated contributions for 1971. PAHO/WHO contributions are estimated at 102.5 per cent; UNICEF's at 123 per cent; and AID's at 95.9 per cent of their 1970 contribution.

The work of international personnel and other contributions in the campaigns' effectiveness cannot be measured by their monetary value. International aid is an essential factor in a continent-wide program. More personnel are supplied where the need is greatest, either because technical or operational problems are harder to solve or because a given program lacks specialized technical resource personnel. Cash contributions also help to even out to some extent marked disparities in the rate of progress of the national campaigns, particularly between neighboring programs.

Table 23

PAHO/WHO FULL-TIME PROFESSIONAL AND TECHNICAL STAFF ASSIGNED TO COUNTRY, INTER-COUNTRY,
AND INTER-ZONE MALARIA ERADICATION PROGRAMS IN THE AMERICAS, FROM 1968 TO MAY 1971*

Country or other political unit	Medical Officers				Sanitary Engineers				Sanitary Inspectors				Entomologists				Others			
	1968	1969	1970	1971	1968	1969	1970	1971	1968	1969	1970	1971	1968	1969	1970	1971	1968	1969	1970	1971
Argentina	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bolivia	1	1	1	1	-	-	-	-	3	1	1	1	-	-	-	-	-	-	-	-
Brazil	5	4	5	5	1	1	1	1	5	5	3	3	2	2	2	2	2a)	2a)	2a)	2a)
Colombia	1	2	2	2	1	1	-	-	4	3	1	-	1	1	1	1	-	-	-	-
Costa Rica	1	1	1	1	-	-	-	-	2	1	1	1	-	-	-	-	-	-	-	-
Dominican Republic ..	1	1	1	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
Ecuador	1	1	1	1	-	-	-	-	3	2	2	2	-	-	-	-	-	-	-	-
El Salvador	2	2	2	2	1	1	1	1	2	2	1	1	-	-	-	1	-	-	-	-
Guatemala	2	2	2	2	1	1	1	1	2	2	1	1	1	-	-	-	-	-	-	-
Guyana	-	-	-	-	-	-	-	-	2	1	1	-	-	-	-	-	1b)	-	-	-
Haiti	1	1	1	1	1	1	1	1	3	3	2	2	-	-	-	-	-	-	-	-
Honduras	1	1	1	1	-	-	-	-	2	1	1	1	-	-	-	-	-	-	-	-
Mexico	1	2	2	2	-	-	1	1	1	-	-	-	1	-	1	1	-	-	-	-
Nicaragua	2	2	2	2	1	-	-	-	4	2	2	2	-	-	-	-	-	-	-	-
Panama	1	1	1	1	1	1	1	1	3	1	1	1	-	-	-	-	-	-	-	-
Paraguay	1	1	1	1	1	1	1	1	2	2	2	2	-	-	-	-	-	-	-	-
Peru	1	1	1	1	1	1	1	1	3	2	1	1	-	-	-	-	-	-	-	-
British Honduras	-	-	-	-	-	-	-	-	1	1	1	1	-	-	-	-	-	-	-	-
Surinam	1	-	-	-	-	-	-	-	3	1	1	1	-	-	-	-	-	-	-	-
Inter-zone and inter-country projects	8	9	10	10	1	1	1	1	-	-	2	2	2	1	2	2	4c)	5d)	4e)	4e)
Total	32	33	34	34	10	9	9	9	46	30	24	22	7	4	6	7	7	7	6	6

*From 1968 to 1970 as of 31 December of each year.

a) Administrative officers.

b) Laboratory technician.

c) Two statisticians and two administrative officers.

d) One economist, one programmer analyst, two administrative officers, and one laboratory technician.

e) One economist, two administrative officers, and one laboratory technician.

Table 24

DRUGS PROVIDED BY PAHO TO MALARIA ERADICATION PROGRAMS IN THE AMERICAS, 1958-1970

(In thousands of tablets)

Country or other political unit	Total 1958-1969							1970						
	Chloro- quine 150 mg.	Primaquine		Pyri- methamine 25 mg.	Combined drug ^{a)}	Aspirin		Chloro- quine 150 mg.	Primaquine		Pyri- methamine 25 mg.	Combined drug ^{a)}	Aspirin 0.50 mg. 0.20 mg.	Fanasil
		15 mg.	5 mg.			0.50 g.	0.20 g.		15 mg.	5 mg.				
Argentina	1 653	248	140	712	-	-	-	70	22	10	-	-	-	-
Bolivia	5 680	660	380	529	310	200	-	1 560	345	101	174	152	-	3
Brazil ^{b)}	92 470	1 513	775	210	1 801	-	-	8 565	51	-	-	-	-	-
Colombia	24 945	2 405	830	4 984	5 612	100	20	2 150	49	-	-	1 840	-	8
Costa Rica	4 650	867	347	213	1 385	227	81	544	96	20	-	-	-	-
Cuba	4 200	38	69	80	-	-	-	150	-	-	-	-	-	-
Dominican Republic	11 530	53	212	782	-	10	10	1 100	-	3	65	-	-	-
Ecuador	10 116	669	240	430	-	-	-	1 940	260	-	-	295 ^{b)}	-	-
El Salvador	14 068	621	660	128	2 070	-	-	2 237	167	142	-	-	-	-
Guatemala	13 961	985	119	77	8 049	200	50	800	152	70	-	-	-	-
Guyana ^{c)}	736	256	86	276	-	-	-	1	2	6	40	-	30	-
Haiti	6 120	82	-	1 480	31 608	-	-	-	-	-	-	-	-	-
Honduras	12 474	1 321	1 178	88	1 290	-	-	527	263	57	-	-	-	-
Jamaica	879	18	-	288	50	-	-	-	-	-	-	-	-	-
Mexico	54 497	8 972	12 117	10 679	4 092	-	-	3 000	500	1 000	-	-	-	-
Nicaragua	10 499	1 548	2 155	6	6 933	-	-	-	-	-	100	-	-	-
Panama	4 040	814	398	162	1 695	-	-	1 650	150	50	80	-	-	5
Paraguay	8 521	145	72	48	-	-	-	991	76	34	20	60	-	2
Peru	21 756	1 109	508	867	1 040	433	40	500	100	-	900	800 ^{d)}	-	-
Trinidad and Tobago	815	940	419	121	400	112	20	-	-	-	-	-	-	-
British Honduras	365	37	35	6	22	61	79	31	2	-	-	-	-	-
Canal Zone	-	-	-	-	90	-	-	-	-	-	-	-	-	-
Dominica	90	1	1	45	-	40	-	-	-	-	-	-	-	-
French Guiana ^{e)}	130	11	10	8	40	-	-	30	10	10	8	-	-	-
Grenada	43	-	-	45	-	20	-	-	-	-	-	-	-	-
St. Lucia	68	1	-	70	-	36	-	-	-	-	-	-	-	-
Surinam ^{f)}	1 611	59	47	536	235	88	10	220	-	-	-	30	40	-
Total	305 917	23 373	20 798	22 870	66 722	1 527	310	26 066	2 255	1 503	1 387	3 185	70	18

a) Chloroquine 150 mg./Primaquine 15 mg. (adult size) unless otherwise indicated. b) Includes 94 700 Tbs. Chloroquine/Primaquine 82.5 mg. (infant size).
c) There were also provided 15 Lbs. Pyrimethamine powder and 1 000 Lbs. Chloroquine powder. d) Includes 150 000 Tbs. Chloroquine/Primaquine 82.5 mg. (infant size). e) There were also provided 950 Lbs. Amodiaquine powder and 500 Lbs. Tricalcium phosphate. f) In addition there were also provided 3 200 Lbs. Amodiaquine powder and 200 Lbs. Tricalcium phosphate.

Table 25

INTERNATIONAL CONTRIBUTIONS TO MALARIA ERADICATION PROGRAMS IN THE AMERICAS
1970 AND ESTIMATED 1971

(U. S. dollars)

Country or other political unit	Date of initiation of total coverage	1970				1971 (estimated)			
		PAHO	WHO and WHO/TA	UNICEF (a)	AID (USA) (fiscal year) ^{b)}	PAHO	WHO and WHO/TA	UNICEF (a)	AID (USA) (fiscal year) ^{b)}
Argentina	Aug. 1959	8 260	-	-	-	-	-	-	-
Bolivia	Sep. 1958	55 247	-	51 000	-	48 584	-	-	-
Brazil	Aug. 1959	79 474	289 573	-	31 412	293 606	-	-	35 650
Colombia.....	Sep. 1958	143 551	-	564 000	-	131 388	-	349 000	-
Costa Rica	Jul. 1957	1 720	39 597	-	-	-	47 994	73 000	-
Cuba	1962	-	5 862	-	-	-	3 000	-	-
Dominican Republic ...	Jun. 1958	37 171	-	-	-	25 573	-	38 000	-
Ecuador.....	Mar. 1957	43 474	27 713	341 000	13 898	46 012	22 848	220 000	-
El Salvador	Jul. 1956	40 788	61 146	-	-	48 084	64 191	83 000	-
Guatemala	Aug. 1956	46 001	53 714	-	-	51 084	58 333	119 000	-
Guyana	Jan. 1947	26 553	-	-	-	34 906	-	-	-
Haiti	Jan. 1962	90 301	-	332 000	129 461	89 768	-	438 000	105 000
Honduras	Jul. 1959	-	44 801	-	-	-	59 094	115 000	-
Mexico	Jan. 1957	108 013	29 609	-	-	137 161	48 000	-	-
Nicaragua.....	Nov. 1958	20 755	71 545	-	-	27 511	69 102	-	-
Panama	Aug. 1957	53 005	20 813	-	-	48 579	44 033	267 000	-
Paraguay.....	Oct. 1957	99 054	-	254 000	42 608	96 558	-	171 000	55 890 ^{c)}
Peru	Nov. 1957	78 047	-	116 000	-	73 157	-	153 000	-
Venezuela		10 028	-	-	-	-	-	-	-
British Honduras	Feb. 1957	15 372	-	-	-	19 506	-	14 000	-
French Guiana	Sep. 1963	11 419	-	-	-	4 600	-	-	-
Surinam	May 1958	25 164	38 430	-	-	35 306	-	-	-
Inter-country projects and general services		566 703	179 774	-	509 239 ^{d)}	642 397	212 911	-	500 150 ^{d)}
Total		1 560 100	862 577	1 658 000	726 618	1 853 780	629 506	2 040 000	696 690

a) Rounded to the nearest hundred, shipping cost included. b) AID loans are shown in Table 19. c) \$950 Grant; \$54 940 Trust Funds. d) Includes the Regional Office for Central America and Panama, and the Central America Research Station.