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DE LA SANTE

MALARIA CONFERENCE FOR WESTERN PACIFIC  
AND SOUTHEAST ASIA REGIONS

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ENGLISH ONLY

The Secretary of the Expert Committee on Malaria has the honour  
to communicate hereunder the following note:

INFORMATION ON THE MALARIA CONTROL PROGRAMME  
IN THE REPUBLIC OF CHINA (TAIWAN)

1. Present status of malaria control in the country

1.1 Recently estimated population of the country: 8,465,350 (June 1954)

1.2 Number of inhabitants living in malarious regions: 5,555,000

1.3 Malaria morbidity and mortality statistics for the last 15 years  
(if available) stating if malaria is a notifiable disease.

Malaria Mortality:	1951	-	28 per 100,000 persons
	1952	-	26 per 100,000 persons
	1953	-	15 per 100,000 persons

Malaria is not a notifiable disease. Morbidity statistics are not  
not available.

1.4 In 1953, a total of 1,526,306 people were directly protected against  
malaria by means of DDT residual spraying.

1.5 See ANNEX II for coverage accomplished in 1953. The malarious areas  
are those shown as covered by spraying operations in 1954 and 1955.

1.6 See answers given in ANNEX 1.



1.7 a. Spleen and Parasite Rates: (Chi-shan District only)

Type of Spray Applied	Date of Survey	Spleen Survey			Parasite Survey	
		Tot.No. Exam.	Spleen Rate	A.E.S.	Tot.No. Exam	Parasite Rate
	June '52	1,687	52.3%	2.24	1,953	23.0%
	----- 1st DDT spray -----					
Com- plete Spray	Dec. '52	1,875	31.6	1.96	1,884	11.5
	June '53	1,705	24.2	1.87	1,705	5.1
	----- 2nd DDT spray -----					
	Dec. '53	1,823	24.7	1.66	1,830	1.9
	June '54	2,071	18.9	1.46	2,277	0.1
	June '52	651	88.0	2.67	762	33.9
	----- 1st DDT spray -----					
Selec- tive Spray	Dec. '52	682	54.4	1.91	684	17.8
	June '53	732	38.3	1.96	730	4.5
	----- 2nd DDT spray -----					
	Dec. '53	738	43.0	1.82	738	2.3
	June '54	773	30.1	1.53	870	0.9
	June '52	1,419	44.5	1.99	1,452	20.3
Check Area for 1952 program	Dec. '52	1,396	53.6	2.09	1,465	25.7
	June '53	1,486	43.5	2.04	1,476	15.8
	----- 1st DDT spray -----					
	Dec. '53	1,532	38.5	1.90	1,532	8.6
	June '54	1,526	26.8	1.63	1,663	2.4

b. Infant malaria new infection, examined monthly (Chi-shan Dis. only)

Survey Period	Selective spray			Complete Spray			Check Area		
	No. Exam.	Tot. Pos.	Para. Rate %	No. Exam.	Tot. Pos.	Para. Rate %	No. Exam.	Tot. Pos.	Para. Rate %
June- Sept. '52	400	38	9.50	833	80	9.60	491	39	7.94
	----- 1st DDT spray -----						----- no spray -----		
Oct.- Dec. '52	314	2	0.64	564	7	1.24	515	34	6.60
Jan.- Mar. '53	369	2	0.54	596	1	0.17	432	9	2.08
Apr.- June	396	0	0	551	1	0.18	447	2	0.45
July- Sept '53	422	2	0.47	574	1	0.17	454	5	1.10
	----- 2nd DDT spray -----						----- 1st DDT spray -----		
Oct- Dec. '53	378	2	0.53	446	0	0	471	2	0.42
Jan.- Mar. '54	370	0	0	528	0	0	440	0	0
Apr.- June '54	392	0	0	587	0	0	490	0	0
July '54	111	0	0	187	0	0	169	0	0

c. Entomological Findings, daytime house collections (Chi-shan District only). For the southern Demonstration District, please see an attached chart, ANNEX III.

Similar encouraging results were obtained from other sprayed areas on the island. Among 1,200 infants under monthly observation in all the sprayed area on the island, no positive cases have been found for the last seven months. A similar reduction in parasite and spleen rates has been observed in all the sprayed areas on the island. Entomologically adult anophelines density in the sprayed premises in various parts of the island has been maintained at zero or near zero level since the spraying.

1.8 Beside the significant reduction in various malaria indices, the DDT spray has almost eliminated infestations of bed-bugs, lice, fleas and cockroaches. According to the surveys for the above insects, the results were very satisfactory. Operationally, the malaria control program has given the local health stations a great deal of encouragement in strengthening their organizations and in giving them a confidence in carrying other public health activities. The benefits of the program are being presented in a separate paper. Regarding the social and economic improvements, there are no data available for the whole island. The only economic survey was one made during a malaria epidemic in a southern Taiwan township. The details of the study are being presented in a separate paper.

## 2. Organization, methods, and training facilities of the present program

At the provincial level, there is a central organization (The Taiwan Provincial Malaria Research Institute) which is responsible for overall planning, training, standardization of formulations, investigations, supervision and assessment of results. At the prefectural level, there are 22 health centers on the island which are responsible for supervision and planning of the field schedule of their respective prefectures or metropolitan areas. At the local level, there are more than 300 health stations (one health station in each township) which are responsible for the field operations in their respective townships under the guidance of provincial and prefectural supervisors. In actual field operations, the various levels mentioned above are integrated to work as a group, as shown in the attached chart, ANNEX IV.

### 2.2 Methods of malaria control

2.2.1 Residual spraying is the only method applied.

2.2.2 In those health stations where malaria is serious, there is an anti-malaria technician who had received training at the Malaria Research Institute before the extensive DDT residual campaign. There are 155 anti-malaria technicians scattered over the highly malarious areas on the island. These technicians are giving therapeutic treatment to malaria out-patients who visit the health station. Blood smears are taken and examined by these technicians before the treatment. Paludrine and atabrine are used for therapeutic treatment. During June 1953 through March 1954 a total of 16,929 cases were treated (out of 106,490 persons examined). Paludrine consumed during this period was 157,458 tablets and atabrine 155,457 tablets.

### 2.3 Training facilities

At the Malaria Control Headquarters (WHO Malaria Control Team and the Malaria Research Institute), there are laboratory and classroom facilities which will take 35 trainees at a time. These facilities were used in the training of anti-malaria technicians during 1949-1951 and for two small classes of local supervisors for DDT spraying during 1952-1953. The regional training courses for local supervisors and foremen for DDT operations were mostly conducted in the field using local facilities, because the classes were too big to be handled at the Headquarters. Local assembly halls, primary schools, hotels and villages were used for accommodation and field practice space with all the teaching materials brought in from the Headquarters. The training of spraymen and helpers was conducted at the local township using local facilities.

### 3. Plan for the future

See ANNEX II, Map 3 and 4 for coverage year by year.

ANNEX 1

Year 1952

1. Area of operations 627.64 sq km
2. Number of houses and all other structures sprayed 21,682
3. Population directly protected 156,217
4. Population protected by other method of control not available
5. Number of spraying in the year one
6. Insecticides and formulations used: Total annual consumption:  
75% and 50% water-dispersible DDT was used.  
Total consumption - 75% water dispersible DDT 13,605 kg  
plus 50% " 5,671 kg
7. Average dose of insecticides per square metre or square foot  
In terms of technical grade 1.86 g per sq metre
8. Type of sprayers used Compression sprayers, Hudson MS-710 Industro
9. All living quarters were sprayed. In case of temples, stores or schools, halls, cinemas, and warehouses, only undersides of furniture or benches or bedrooms, if any, were sprayed. In case of stables, if they were in the completely sprayed area they were sprayed and if they were in the selectively sprayed area they were not sprayed.
10. Average superficial area sprayed during each spraying per inhabitant 42.2 sq metres
11. Cost of residual spraying operations
  - 11.1 Total cost NT\$367,155.42
  - 11.2 Percentage of the total sum expended on insecticide formulations 63.54 percent
  - 11.3 Cost per capita NT\$2.46 per capita
12. None
13. None
14. Comments

In 1952 program, the spraying operations were practically directed by the Headquarters' personnel at the local level. The expenses shared by the local

Annex 1

townships were only 15.4% of the total cost. Since this was initially a demonstration area, the population covered by the 1952 program was rather limited.

Year 1953

1.	Area of operations	10,056.55 sq km
2.	Number of houses and all other structures sprayed	184,653
3.	Population directly protected	1,526,306
4.	Population protected by other method of control	not available
5.	Number of spraying in the year	one
6.	Insecticides and formulations used	75% water dispersible DDT
	Total consumption	173,707 kg
7.	Average dose per sq.metre	2.09 grams per sq metre
8.	Compression sprayers	Hudson Hand Sprayers, MS-710, S-710, Climax Smith, & Decontaminator  Lofstrand Hand Sprayers (limited in number)
9.	Same spraying pattern was applied as done in 1952 program.	
10.	Average superficial area sprayed during each spraying per inhabitant	43.44 sq metre
11.	Cost of residual spraying operations	
	11.1 Total cost	NT\$4,118,704.98
	11.2 Percentage of the total sum expended on insecticides formulations	51.12 percent
	11.3 Cost per capita	NT\$2.70
12.	None	
13.	None	

Annex 1

14. Comments

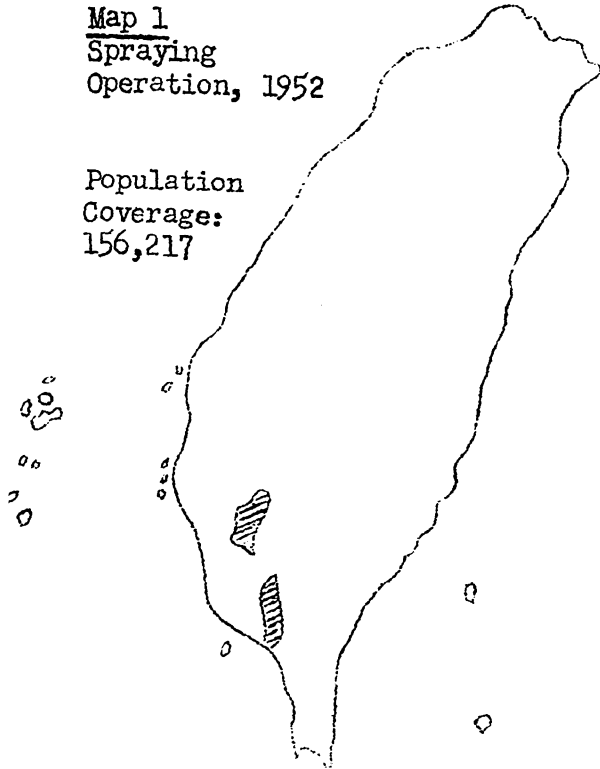
In the 1953 program, the spraying operations were directed by the prefectural and the Headquarters' personnel jointly. The expenses borne by the local townships totaled 47.00% and by prefectures 0.47%. Areawise, the operations were more than ten times as large as those of 1952.

ANNEX III

FOUR-YEAR ISLAND-WIDE MALARIA CONTROL PROGRAM

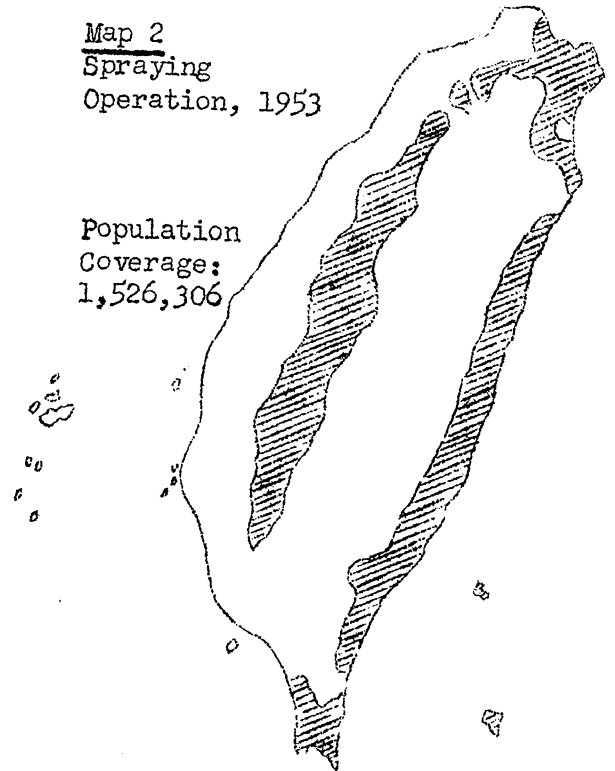
Map 1  
Spraying  
Operation, 1952

Population  
Coverage:  
156,217



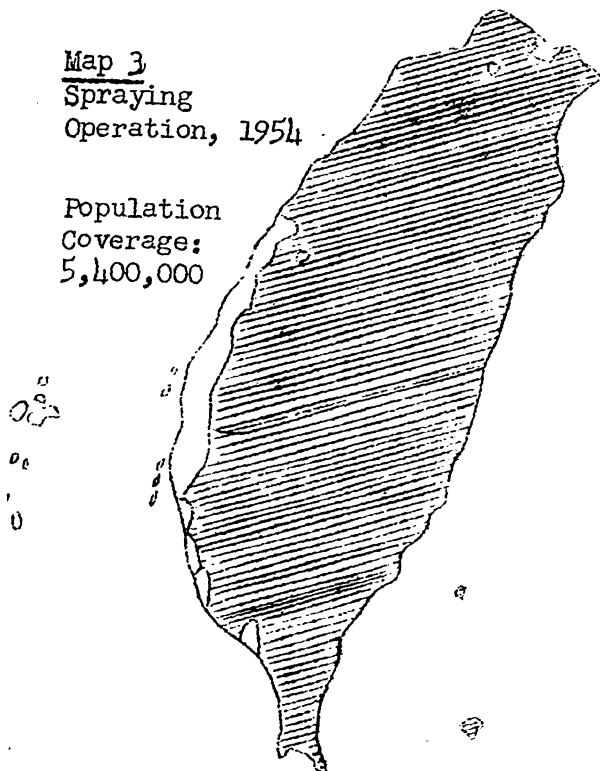
Map 2  
Spraying  
Operation, 1953

Population  
Coverage:  
1,526,306



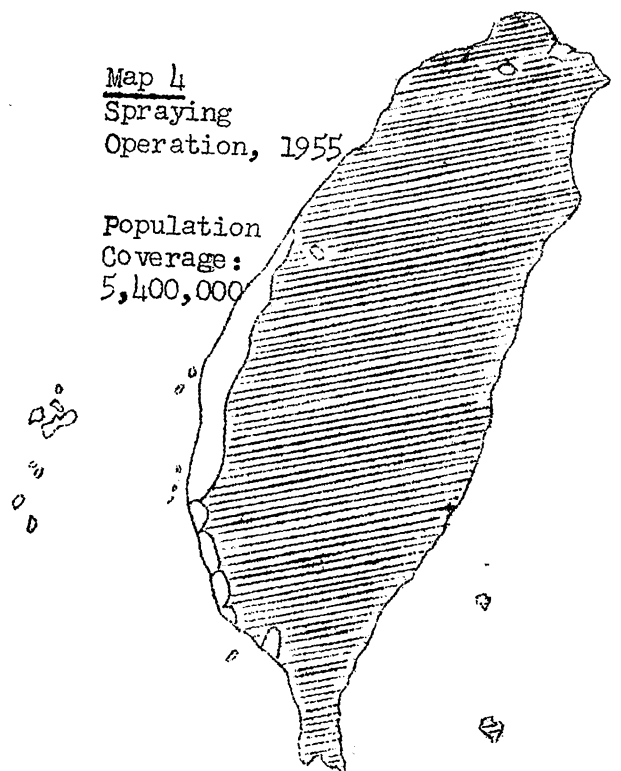
Map 3  
Spraying  
Operation, 1954

Population  
Coverage:  
5,400,000



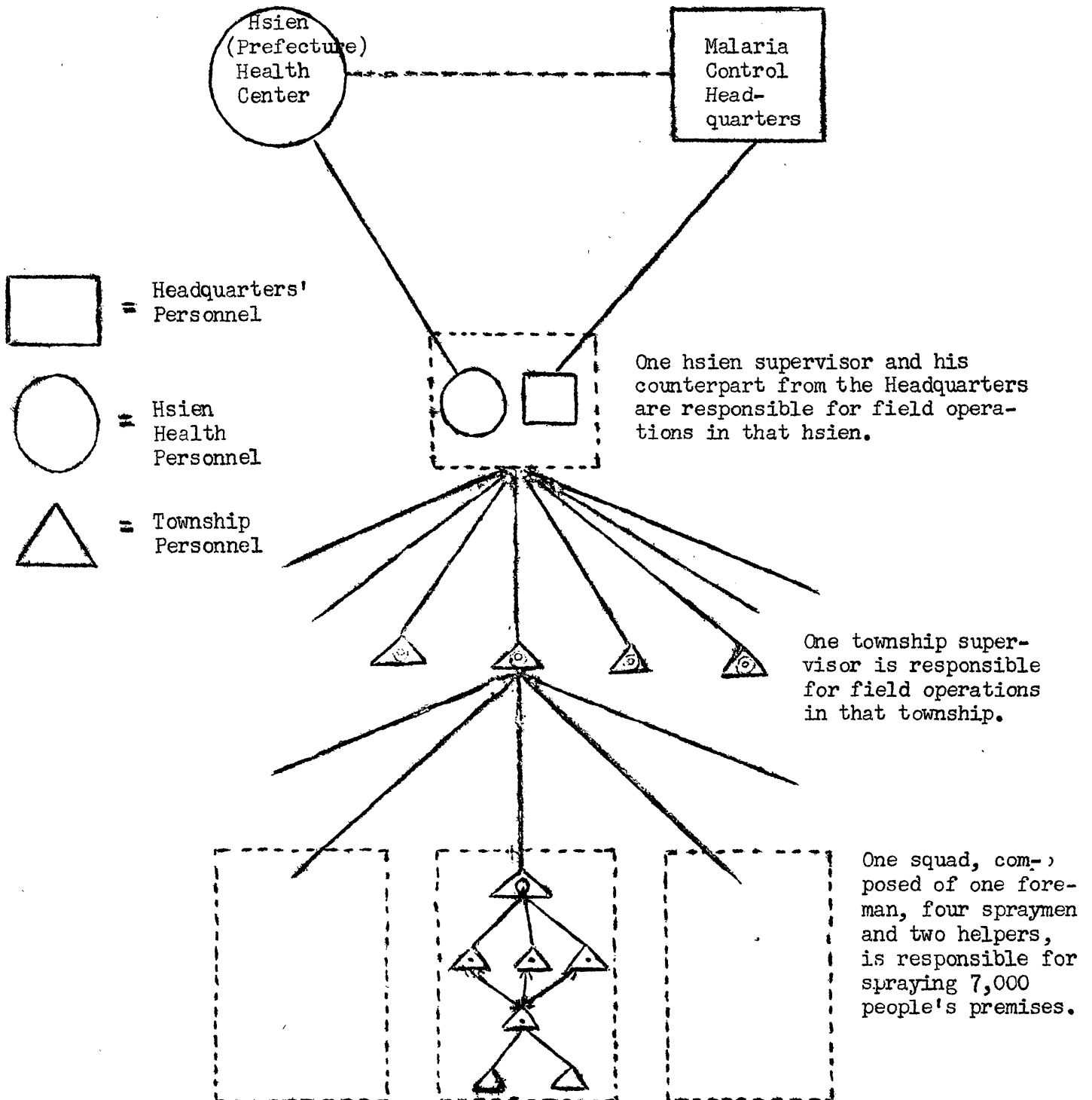
Map 4  
Spraying  
Operation, 1955

Population  
Coverage:  
5,400,000



ANNEX IV

FUNCTIONING CHART, SHOWING THE FIELD  
OPERATIONS IN A HSIEN (PREFECTURE)



Average Number of Anopheline Mosquitoes per House

