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UNITED NATIONS INTERNATIONAL CHILDREN'S EMERGENCY FUND

PROGRAMME COMMITTEE

Insect Control Programmes in Central America

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I. SUMMARY

1. At its last session, the Executive Board approved an initial allocation of \$200,000 for an insect control programme in Central America to include all the countries of British Honduras, Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua (E/ICEF/136, paragraph 49). It was recognized at that time that the total cost of this regional programme would be greater, but, as all the individual countries had not yet completed detailed plans of operations, the Administration was instructed to continue negotiations with the Governments and make recommendations to this session of the Executive Board for allocations sufficient to carry out the total programme in each country. This was done, and the Administration now recommends an additional allocation of \$314,000 from the over-all allocation to Latin America for this programme. -- this total allocation for insect control programmes in Central America to be apportioned among the six participating countries as follows:

British Honduras	\$ 22,000
Costa Rica	91,000
El Salvador	100,000
Guatemala	94,000
Honduras	86,000
Nicaragua	<u>121,000</u>
	\$514,000

2. The objective of the programme is to reduce drastically the incidence of insect-borne diseases and thus, in particular, to effect an important reduction in mortality and morbidity among children. Malaria is the most important disease which will be controlled by this joint effort. In addition, Chagas disease, enteric diseases, typhus, and yellow fever will be attacked through their carriers.

3. To achieve the..

3. To achieve the objective, the Governments of the six countries, UNICEF, and WHO will work in close cooperation. The six Governments, through their Ministries of Health, will actually carry out the campaign with their own personnel, as well as provide gasoline and maintenance for transport, and various supplemental local supplies. UNICEF will provide the basic tools; DDT, sprayers, transport, and related equipment. The World Health Organization has assisted the Governments in developing their plans, has approved them, and will give continuing technical assistance throughout the programme.

4. The campaign will require two years to complete, and each of the Governments has agreed to furnish the necessary local supplies, services and personnel for this period.

5. The Administration recommends that the plans of operation below be approved.

6. It will be recalled that, in addition to the insect control programme in Central America for which an initial apportionment was made at the last Board session, the Board also approved apportionments for feeding demonstration projects totalling \$240,000 (Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua; E/ICEF/136, paragraph 45).

PROPOSED PLAN OF OPERATIONS FOR INSECT CONTROL PROGRAMME IN BRITISH HONDURAS *

British Honduras has an area of 30,000 square kilometers with a population of 63,000 inhabitants. The capitol is Belice with a population of 25,000 inhabitants, and the second largest city is Stann Greek with 3,500 inhabitants.

TRANSPORTATION

There are roads in the northern and central part of the country. In the southern part of the country travel is done by boats. There are 23 miles of railroad.

SICKNESSES THAT CAN BE CONTROLLED BY THE USE OF DDT

The principal diseases are: Malaria and intestinal infections. The children are the principal victims of these sicknesses.

Aedes aegypti is found in various communities, including the capitol, Belice, which has a high index rate.

PRESENT MEASURES OF CONTROL

Due to a lack of supplies the campaign against malaria has not been effected on a widespread scale. A few small communities, however, were DDT-ized with good results. The campaign against Aedes aegypti is difficult and is carried out jointly with the sanitary inspection.

MEASURES NECESSARY

As all the other countries of Central America are receiving aid from UNICEF, it would be of great benefit to aid British Honduras, since a lack of action in this country could reduce the positive results obtained in the neighboring countries.

Since the population of British Honduras is small, it is not necessary to give it as much assistance as required by the other countries.

The development of the program would include the treatment of 12,500 homes in the country with residual DDT applied on the walls. Of these 12,500 homes, 5,000 are in Belice, the capitol, which will facilitate the work considerably.

The Government of the country agrees to supply the personnel, viaticum, gasoline, oil, supplies and reparation of vehicles. Since we already have personnel trained in DDTization, the amplification of these projects would be very easy.

The World Health Organization, through the Pan American Sanitary Bureau, will give the necessary technical assistance for the campaign.

CONTROL OF RESULTS

Controls similar to those in Honduras will be instituted.

/AVAILABLE PRESENTLY

AVAILABLE PRESENTLY

Personnel: 11 inspectors of which 8 could work on the campaign.

Material: 12 sprayers (four Oaks Sprayers
200 pounds of 100% DDT
1 hand lamp of 3 batteries
26 batteries
20 bulbs

Budget: \$2,550.00

ADDITIONAL REQUIREMENTS FROM UNICEF

300 drums of 100% DDT (200 lbs. @).....	\$15,000.00
1 jeep (Universal).....	1,200.00
12 flashlights.....	12.00
480 batteries.....	30.00
120 flashlight bulbs.....	6.00
5 entomological lenses, magnification 20X	21.00
30 drums Xylol (274 lbs. per bbl.).....	2,525.00
2 drums Triton X-100 (55 gal.).....	320.00
technical assistance.....	3,000.00
Total	<u>\$22,114.00</u>

SUMMARY OF CONTRIBUTIONS

1. UNICEF (1950 and 1950)		US \$22,114.00
2. Government of Honduras	1950	US \$ 2,550.00
	1951	US \$ 2,550.00
	Total	\$ 5,100.00

The Government of the colony, if it is necessary, will use its consignment of material, for extra personnel and per diem and will give additional sums for the best utilization of UNICEF's contribution.

In addition to the contribution of the Government, mentioned above, it will use the material already existing or acquired by the colony for the insect control project.

The Government will also provide office facilities, will direct and control the application of materials supplied by UNICEF and will continue the program when UNICEF's aid ceases.

3. WHO/PASB

The WHO/PASB will provide the necessary technical assistance for the development of the program without expense to UNICEF and the Government of British Honduras.

PROPOSED PLAN FOR THE DEVELOPMENT OF AN INSECT CONTROL PROGRAM
IN THE REPUBLIC OF COSTA RICA

The Republic of Costa Rica has a population of about 1,000,000 with a geographical area of 49,827 square kilometers. It consists of seven provinces, all of them scourged by malaria, the second highest cause of death and sickness and an extremely strong factor in infant mortality. Malaria is one of the factors that greatly hinders the economic development of the country, since the human yield in the affected areas is greatly reduced.

As in the other countries of Central America, enteritis, diarrhoea, and dysentery in Costa Rica combine to form the highest sickness and mortality rate, especially among children. Costa Rica does not have typhus transmitted by the tick or the louse, but it does have typhus murine.

The last diagnosis of yellow fever cases were made in 1918, and as a result of this it was shown that the entire population is susceptible to the sickness due to the lack of immunity. The reappearance of yellow fever in Panama has brought the danger closer to Costa Rica. In 1949 a campaign against its common carrier was undertaken, but the local resources are insufficient to obtain, in a short time, the desired results in view of the situation it confronts.

Filaria also constitutes an important problem in the Atlantic zone of the country.

Chagas disease, which is a serious problem in various South American countries, has already penetrated Costa Rica. If it is not combatted efficiently now, it will also in the future present another serious sanitary problem to the country.

The application of DDT in the homes, accompanied by the DDTization of water deposits, permits the eradication of aedes and decreases muscidae infestation. This will cut down the number of enteric sickness which affect children principally. Since malaria is responsible for an increasing number of still-births, the application of DDT will have an influence on the live birth rate.

Projects already undertaken.

The DDTization of the homes in Costa Rica, performed only on an experimental level up to 1947 in seven localities, has produced very good results.

In spite of the fact that the Government well understands the wonderful advantages derived from an extensive DDTization program, the resources on hand are not sufficient to organize this service in a way that the problem warrants. The projects will be effected by the Department of Sanitation of Sanitary Engineering under the immediate direction of a technician trained in the School of Malariology of Maracay, Venezuela, in the Department of the Prophylaxis of Yellow Fever and Malaria.

/Objectives

Objectives

The objective of the program is the control of insect disease carriers throughout the country, with the purpose of eradicating aedes, controlling malaria and decreasing the morbidity and mortality due to gastrointestinal diseases, especially among children. In addition, we will take advantage of this opportunity to train the personnel that will be in charge of the continuance of the program after UNICEF aid ceases.

After completing the two year intensive program, the program, carried out by the Ministry of Health, will be continued for the consolidation and maintenance of the results.

Two-year Program, to begin in 1950

The proposed control program will be carried into effect by the Department of Sanitary Engineering reaching all zones affected by malaria and infested by aedes. The program will consist basically of the application of DDT in the homes, barns and other outdoor passage ways. With this in mind the Government proposes to increase the number of employees proportionally to the intensity of the program, organizing a minimum of 6 crews of 7 to 10 workers under the direction of an inspector chief. Due to the fact that a majority of the population live in rural areas, the crews will have to travel by car, train, plane, and sometimes by horse.

The above mentioned program will be under the immediate direction of the inspector chief, who studied in the School of Malariology in Maracay, Venezuela, and who will need only special training in Guatemala for a four week period. In order to facilitate the development of the program and since this training is very important, it was included in the budget requested of UNICEF. This includes travel and per diem expenses, since in addition to lack of means, the Ministry also lacks budget provision applicable for such a case. It will also be necessary that the inspector sent to Guatemala visit Costa Rica for six months to teach the local inspectors here the latest technical developments in DDT spraying, since there is no inspector with this training in Costa Rica.

Origin of Funds

The following contracting parties will contribute to the maintenance of a two year program:

- 1) The Government of Costa Rica will provide the necessary local personnel and administrative expenses of same. The personnel will include workers in the Division of Malaria and Yellow Fever and workers in the Division of Sanitation and Sanitary Engineering. In addition, it will supply additional personnel needed for the undertaking of said program.

Due to the nature of the projects, the personnel should be supplied with proper uniforms, the life of which is lessened due to the continuous washing required because of the use of DDT. This is the reason that that is included in the requested budget as a special item.

/The Government

The Government will also supply the gasoline, oil, supplies and other material not given by UNICEF.

2) We request from UNICEF that it contribute material, equipment, and means of transportation for the realization of this program.

3) The Pan American Sanitary Bureau, Regional Office of the World Health Organization, will contribute the necessary technical assistance.

Budget

The expense calculated for this two year program is the minimum necessary for an efficient undertaking of this program.

The contributions of the contracting parties are:

Government of Costa Rica	\$86,120.00
UNICEF	<u>90,163.20</u>

Attached are details of the budget in order to facilitate the study of the total program. It should be understood, however, that these figures are subject to change under the Director of the campaign in accordance with the needs for the realization and benefits arrived from same.

Direction of the Program

It is recommended that this program remain under the direction of two properly trained technicians from the Ministry of Health in Costa Rica and with the technical assistance of the Pan American Sanitary Bureau, Regional Office of the World Health Organization.

Control of the Results

The control of the results will be carried out through investigation for mosquitoes and hemipterous insects through the Control Service checking 3 to 6 months after the DDTization of the homes. The tests will be made in only 1/3 of the homes sprayed. Houses separated by more than 50 meters will also be tested. The presence of aedes after DDTization will indicate an incomplete spraying and will require a search of hidden larva nests or a new spraying of the zones infested. The work will also be considered unsuccessful if there are present in large numbers anopholes mosquitoes or the species responsible for the transmitting of malaria in the DDTized zones especially when the transmitter shows a high haematocrit count.

Before the DDTization is carried out a survey will be made in the filaria zone for the search of infested mosquitoes which will serve as a means of comparison of the results obtained in the DDTization in relation to this sickness. In addition, a survey will be made before DDTization of infested areas for Chagas sickness in order to obtain the following data:

/1) Percentage of

- 1) Percentage of homes with live Hemipterous insects.
- 2) Percentage of homes with dead Hemipterous insects.
- 3) Rate of live Hemipterous insects per home.
- 4) Rate of dead Hemipterous insects per home.
- 5) Presence of live Hemipterous insects infected with Trypanosome.

After the DDTization several surveys will be made in the same area for comparison of the results obtained by the application of the insecticide.

The mortality rate before and after DDTization will be compared and will serve for the orientation of these projects.

Contribution of Costa Rican Government.

Present Personnel

- 1 Chief
- 1 Typist
- 1 Microscopist
- 2 Inspector Subchiefs
- 1 File Assistant
- 14 Inspectors

In addition the Department of Sanitation and Sanitary Engineering will provide workers according to the need.

Present Material

- 50 hand lamps of two batteries
- 800 batteries for hand lamps
- 160 bulbs screw type for hand lamps
- 2300 pounds of DDT 50% wettable for suspension
- 1 entomological laboratory
- 1 machine for nebulization
- 750 pounds of DDT 85% for solution
- 6 sprayers for DDT spraying, Mormal type

Budget (The increase for the new program is included)

		<u>(1950)</u>	<u>1951</u>
Personnel	U.S.\$	27,760	27,760
Material and Miscellaneous		5,300	5,300
Viaticum		10,000	10,000
		<hr/>	<hr/>
TOTAL		43,060	43,060
Total for 1950 and 1951			86,120

The Department of Sanitation and Sanitary Engineering will supply the workers and materials needed.

/If it

If it is necessary, the sum allotted to material and miscellaneous can be used for personnel and viaticum.

UNICEF Contribution to the Republic of Costa Rica

<u>Material</u>	<u>U.S. \$</u>
2100 100-pound drums DDT 75% wettable	70,000.00
2,000 pounds of DDT 100% for solution	1,784.00
* 2,400 bulbs General Electric or Phillips 2.5 bolts	120.00
960 Eveready batteries for hand lamps	58.00
6 jeep station wagons 4 wheel drive	10,500.00
1 small adding machine	100.00
1 compound microscope, binocular, Bausch and Lomb model CTA 8 No. 56700	299.00
1,200 feet of hose, oil resistant for sprayers Dobbins 3/8" in diameter	360.00
20 Entomological lenses for 20 increases	83.00
** 80 Dobbins sprayers complete model 44C.S.	711.20
80 shut off nozzles Dobbins model 71T	120.00
200 nozzles 8002 (spraying System Co. Chicago 24)	360.00
160 Gaskets oil resistant for sprayers no. 44 C.S. Dobbins	48.00
80 Extension rods Dobbins of 24 inches long	40.00
1,500 yards of material Khaki for uniforms of personnel	3,000.00
50 raincoats medium size appropriate for horseback riding	450.00
50 helmets medium size	50.00
	<hr/>
	88,083.20

Personnel

Transportation of a technician from neighboring country (Guatemala) going and coming	125.00
Salary of a technician for 6 months US \$200.00 per month	1,200.00
Viaticum of the technician US \$3.00 per diem	450.00
Transportation to and from Guatemala for the Chief of the Phrophylaxis Section on Yellow Fever and Malaria Control for study of organizations for that field in that country.	125.00
Viaticum for the Chief of the Prophylaxis Section of Yellow Fever and Malaria Control for a 15 day stay in Guatemala at \$12.00 per day	180.00
	<hr/>
TOTAL	2,080.00
	90,163.20

/Resume of

Resume of the UNICEF Contribution to Costa Rica

	<u>U.S. \$</u>
*** Material	88,083.20
Personnel	2,080.00
	<u>90,163.20</u>

Contribution of WHO/PASB

WHO/PASB will contribute the technical assistance, paying the expenses of their technicians for this purpose.

Costa Rica - Resume of the Contributions

UNICEF (1950-1951)	U. S. \$ 90,163.20
Government of Costa Rica	<u>86,120.00</u>
	<u>176,283.20</u>

(sgd) Dr. Raul Blanco Cervantes
Minister of Public Health

(sgd) Dr. Adhemar Paoliello
Representative of
WHO/PASB

* For the search of larva nests and capture of insects.

** Each sprayer lasts about a year. There is no material in the Ministry of Health adequate for the use of DDT.

The Hudson Sprayer is not well enough known in Central America, and there is no advantage in using various types of sprayers. The Dobbins sprayer is as efficient as the Lofstrand sprayer at least three times cheaper and perhaps more durable. The Government will provide the office facilities and will control the use and conserve UNICEF material. It will continue the execution of the program when UNICEF aid ceases.

*** In addition to the material already existing or acquired.

PROPOSED PLAN OF OPERATIONS FOR AN INSECT CONTROL PROGRAMME

DIRECTED PRINCIPALLY AT ANTI-MALARIA IN EL SALVADOR

The country is situated in the tropical zone between latitudes 13° 10' N. and 14° 30' North and between longitudes 87° 40' and 90° 10' to the west of Greenwich. It is bounded on the North, West and East by the Republic of Guatemala and Honduras, and on the South by the Pacific Ocean. Its shape is more or less rectangular with its principal axis parallel to the coast of the Pacific Ocean. Its width to the North from the coast varies between 75 to 110 kilometers.

It is estimated that the area of the country is 21,160 sq. kilometers.

Topography

The most outstanding topographical characteristics of the country are:

- (a) coastal plains variable from 5 to 30 kilometers in width and broken up by the mouths of several important rivers;
- (b) elevations formed by two principal mountain chains that cross the country from West to East; one mountain chain runs along the length of the coast and the other along the North of the Republic. The coastal chain of mountains begins in the middle of Ahuachapan, crossing the country completely and ends in the extreme Southeast in the State of La Union. This last mountain chain consists of numerous volcanoes. The northern mountain chain begins in the Northwest and goes along the North through the States of Santa Ana and Chalatenango, from there it projects a counterfort to the Southwest of the country;
- (c) between these two mountain chains there exists a third intermediary network to the North of Morazan and La Union.

The territory is divided into four altitude levels. The first from 0 to 300 meters, corresponding to 40% of the total area of the country; the second from 301 to 600 meters, corresponding to 42% of the area; the third from 601 to 900 meters, corresponding to 13%; and the fourth from 900 meters, corresponding to the remaining 5%.

The country is volcanic and there are three big divisions in soil composition, each of these is itself composed of various types of terrain:

- (a) the alluvial coastal plain found in four sections of the country, with an area of 1,904 sq. kilometers and a population of 112,000 inhabitants - or 58.5 inhabitants per sq. kilometer;
- (b) the coastal chain of volcanoes and slopes leading down to recent deposits of ashes and volcanic clay where approximately 1,142,000 inhabitants live in an area of 7197 sq. kilometers. The density

/of the population

of the population is 158 inhabitants per sq. kilometer. The terrain of this zone is classified as sand, dark marl, red argilliferous and lava;

- (c) the mountain ranges, which form a frame for the country in its Northeast and Eastern regions, consisting of thin soil and a rocky stratum at different stages of weathering which is made up of red argilliferous and marly alb. This comprises an area of 11,546 sq. kilometers with 708,000 inhabitants - or 62.7 inhabitants per sq. mile.

The composition of the terrain of the country is an important factor since some malarialogists feel that argilliferous and calcareous soil is favourable for the growth of insects. The terrain would also condition the possibility of a permanent anti-malaria control programme through drainage or reforestation.

Climate

The climate of El Salvador is primarily tropical; there are only two seasons, the rainy and the dry. The rainy season occurs from May to November; the dry season lasts the other six months.

The average temperature of the country is 23.50 with variations from 7.4 to 40.60. Along the coast the temperature fluctuates between 20° C and 43° C. The average temperature is lower during the dry season. It is estimated that there is a decline of 1° C in the average temperature for every 100 meters of altitude progressed.

The humidity is relatively high in the country even during the dry season. The average during the last 35 years has been 74%; the average fluctuating between 66% in March and April up to 82% in June. The average humidity is greater along the coast.

The direction of the wind is predominantly North/Northeast. Along the coast the wind is changeable, it blows towards the ocean during low tides and towards the land during high tides.

In reality the rainy season starts in May. The months of highest precipitation are June and September, although in some years July, August and October were the most copious.

The average number of rainy days during the season is 118.

Hydrography

There are approximately 350 short rivers and rivulets which have their origin in the mountains of the volcanic chain and run generally toward the South and the Pacific Ocean.

The Lempa River crosses the entire Republic traversing 260 kilometers of terrain. It has about 30 large tributaries which in turn feed other large rivulets. Its river bed provides a rich agricultural zone and one of high malaria count. It

/terminates in the

terminates in the region of Jaltepeque where there exist swampy regions of mangrove trees. In the state of Usulután there is another swampy region known as the harbour of Jiquilisco.

There are two lakes; they are in Ilopango and Coatepeque, of definite volcanic origin and are most probably ancient volcanic craters.

The lake in Guija at the border between El Salvador and Guatemala is a large deposit of little depth with its mouth in the River Lempa.

The Lake in Olomega is situated in a swampy region to the Southwest of San Miguel. The lagoon in Zapotitán is situated in a decline in the valley of San Andrés and is in reality a marsh.

Population

The population of the Republic of El Salvador, 30 December 1948, was calculated to be 2,122,749 inhabitants. This means an average of 100 inhabitants per sq. kilometer and shows that El Salvador is the country most densely populated in the American continent.

The agricultural nature of the country determines that this population be spread over the rural zones leaving only 43% of the population living in urban communities. In consequence, of the total population 1,177,000 is rural. Although a great many communities are classified as urban, they are in reality rural villages with small populations and a general lack of public utilities.

Sources of Wealth and Commerce

El Salvador is a country essentially agricultural. The industries that depend exclusively on agriculture are limited. The industries with no relation to agriculture are also of little importance, and can be summed up as: production of bricks and roof tiles; mining of gold and silver; extraction of quicklime and sea salt; foundries and machine shops; and the manufacture of beer and soft drinks.

The main commercial export product of the country and the principal source of income is coffee. In 1948, El Salvador exported the total of 114,014,696 colones, equivalent to 45,605,878 dollars (US), of which 90,417,618 colones, equivalent to 36,167,047 dollars (79.3%) represented coffee.

The fact that it is an agricultural population is the reason, with the exception of the 9 principal cities in which the people develop their own activities, why the largest percentage of the men and a good percentage of the women depend on work in the fields. This situation necessitates that the largest portion of the population live in the fields the greater part of the day. This is one of the reasons why malaria is found in urban centres in spite of anti-malaria drives, and why it must be considered not just a local problem but must include all the surrounding endemic rural zones.

Transportation

Transportation facilities

There are two railway systems in El Salvador which cover 604 kilometers. One of these railways has a connection with Puerto Barrios on the Atlantic seaboard across the Republic of Guatemala.

Both railways give service to the most populated sections of the country, carrying yearly around 2,500,000 passengers and 465,000 metric tons of cargo.

The Republic has 400 kilometers of highway and 400 kilometers of secondary roads which facilitate automobile travel. There are also about 8,000 kilometers of roads used only by people walking, carts and oxen.

There are approximately 1,500 buses and trucks, 2,500 automobiles, 600 motorcycles and bicycles. The ox cart is one of the principal means of travel; almost all the products of El Salvador are sent by cart at some time or other before reaching the railways and trucks for their final destination in the market or factory.

El Salvador is serviced by 4 air lines and has an airport situated in Ilopango, 8 kilometers from the Capital.

This airport has a capacity for large planes, but as yet there is no night service. Around 2,500 planes come in and take off each year carrying some 15,000 passengers.

479 boats reached our ports carrying 166 passengers, 113,337,182 kilograms of import cargo and 82,092,496 kilograms of export cargo (year 1947).

MALARIA

Second to enteric illnesses, malaria causes the greatest number of deaths in the country.

It has been established that malaria causes 11.6% of all the deaths in the country. In the Rosales Hospital, where they take in patients from all over the Republic malaria is responsible for a minimum of 11% of the patients and a maximum of 20% of the patients. In this hospital, malaria is responsible for 7% of the deaths.

An investigation carried out during the years 1938, 1939 and 1940, in the 261 municipalities of the country, showed that 257 of them were affected by malaria, with a spleen index average of 22.5, and a parasitic index of 6.23%.

Up to the present time, the measures taken to combat malaria have been extremely negligible in relation to the enormous public health problem created by this illness.

TABLE NO. 1

Population and Birth and Death Rates in
El Salvador in the Period 1938-1948

Year	Population	<u>BIRTHS</u>		<u>DEATHS</u>	
		Number	Rate per thousand	Number	Rate per thousand
1938	1,704,497	69,608	40.8	30,461	17.8
1939	1,744,535	71,694	41	31,656	18.1
1940	1,787,930	74,637	41.7	31,242	17.4
1941	1,829,816	72,376	39.5	30,490	16.6
1942	1,862,930	71,414	38.3	38,250	20.5
1943	1,896,168	71,554	37.7	37,366	20.2
1944	1,934,925	72,590	37.5	33,833	17.4
1945	1,977,849	74,660	37.7	31,736	16
1946	2,018,895	72,042	35.6	30,996	15.3
1947	2,072,506	84,330	40.6	30,719	14.8
1948	2,122,749	80,770	38	30,527	14.3

TABLE NO. 2.

Rate of Infant Mortality and Stillbirth in El
Salvador in the Period 1938 - 1948

Year	<u>INFANT MORTALITY</u>		<u>STILL BIRTHS</u>	
	Number	Rate per thousand	Number	Rate per thousand
1938	8,158	117.2	719	9.9
1939	8,289	115.6	625	8.3
1940	9,019	120.8	732	10
1941	7,618	105.2	788	10.9
1942	8,390	117.4	765	10.5
1943	7,968	111.3	758	10.3
1944	8,557	117.9	760	10.1
1945	8,064	107.9	774	10.6
1946	8,139	112.9	841	9.8
1947	8,129	96.4	914	11.1
1948	7,569	93.7	902	11

TABLE NO. 3

Number of Deaths caused by malaria, diarrhea and enteritis
in children under two years of age, and by pulmonary
tuberculosis in El Salvador, during the years
1938 - 1948

Year	MALARIA		DIARRHEA AND ENTERITIS IN CHILDREN UNDER TWO YEARS OF AGE		PULMONARY TUBERCULOSIS	
	Number	Rate per thousand	Number	Rate per thousand	Number	Rate per thousand
1938	3,565	209.	2,624	153.9	699	41
1939	3,418	195.2	2,349	134.6	711	40.7
1940	3,325	186.9	2,791	156.1	640	35.7
1941	3,330	183.3	2,615	142.9	788	43
1942	4,870	263.7	2,979	159.9	838	44.8
1943	4,446	247.2	2,214	116.7	782	41.2
1944	3,691	192.7	3,401	175.7	800	41.3
1945	3,288	168.1	3,378	170.7	769	38.8
1946	2,946	147.6	2,895	143.3	844	41.8
1947	2,780	134.2	2,904	140.1	773	37.2
1948	2,787	131.2	3,068	144.5	796	37.4

General Epidemic data on Malaria in El Salvador

Throughout El Salvador, malaria constitutes one of the principal, if not the principal, causes of sickness and death. Four zones can be established:

- (a) Low endemic zone. The regions at 900 meters altitude where the spleen index varies between 5% and 20%. 107 of the 261 municipalities of the country belong to this group with a total of 931,150 inhabitants.
- (b) Moderate endemic zone. Region where the index varies between 21% and 35%. In this category fall the regions between 601 and 900 meters in altitude. 67 municipalities form this group with a total of 571,103 inhabitants.
- (c) High endemic zone. Region where the index varies between 36% and 50%. This includes 51 municipalities inhabited by 366,340 persons.
- (d) Hyperendemic zone. Region where the spleen index is over 50%. In general it covers the coastal region, the river basin of the Lempa. This comprises 36 municipalities with a total of 254,156 inhabitants.

The above classification is based principally on the Malaria Survey made in 1939-1940 by Dr. Victor Arnoldo Sutter.

/All the cities

All the cities studied this year, with the exception of four, have shown a spleen index-rate similar to that found by Sutter in 1939 and 1940. This has been due, unfortunately, to the inability to pay for a programme that would adequately eradicate this tremendous problem.

It is a fact that those regions of highest agricultural production are also those in which malaria attacks with greatest intensity.

For example, there is one region which is situated in a rich valley, bounded to the North by the Lempa River, to the South by the highway that joins Armenia with San Martin (the Panamerican Highway), to the East by the boundary between the States of Santa Ana and La Libertad, and to the West by the boundary between the States of Cuscatlan and Cabanas. It has a population of 167,000 inhabitants and is an area of 1,740 sq. kilometers. For the purpose of measuring the prevalence of malaria in this zone, four tests were made in the rural districts where the spleen index was shown to be greater than 50%, and which was thus classified as hyper-endemic. It was planned to organize an anti-malaria programme in this zone, which is cut through by good roads and which produces 58% of the sugar of the Republic, but this programme could not be realized due to lack of funds.

PROGRAMMES FOR THE CONTROL OF MALARIA
IN EL SALVADOR SINCE 1932 TO THE PRESENT DATE

Permanent Drainage

San Miguel

The anti-malaria drainage programme in the city of San Miguel was initiated in 1932 and continued until 15th July 1942, with the co-operation of the Rockefeller Foundation. From that date onwards it was financed by the Interamerican Co-operative Service of Public Health, having been completed at the beginning of 1943. For the maintenance of these works there is a group of five workers and one chief paid by the municipality of San Miguel. In 1948 some repairs were made and a new banking of the canal was done. There are 7,946 meters of paved canal, 925 meters of subterranean drainage and 525 meters of dirt canals. The number of persons protected by this programme totals 19,012.

Usulután

The drainage programme in Usulután was completed in 1942. It was financed by the Director-General of Sanitation and the Rockefeller Foundation. The maintenance of these works has been in charge of the Municipality of Usulután. There are 240 meters of paved canals. These services have provided for 9,347 people.

Sonsonate

The network of irrigation canals and anti-malaria drainage to the North of the road dividing Mahuilingo and Cuisnahuat was started in August 1942, in collaboration with the Director-General of Sanitation and the Co-operative Service and the municipality of Sonsonate. This project was completed in 1943 with a length of 3,292

/meters of paved

meters of paved canal with flagstones made of concrete. After finishing this project the section to the south of the road between Nahuilingo and Guinahuat was built, still in co-operation with the Co-operative Service, the municipality of Sonsonate and the Director-General of Sanitation. This work was completed in 1944 having been paved with bricks for the most part made of clay, and adding 3,150 meters of canal.

The maintenance of this system of irrigation and drainage is in charge of a group of four workers and one chief. This group was maintained till the end of 1947 by the Co-operative Service and after that date by the Director-General of Sanitation. This project has serviced 19,337 persons.

Acajutla

In the middle of the year 1942 topographical plans were developed for the Port of Acajutla, and plans were laid for the control of malaria in this region. In the same year the draining of a marsh situated to the North of this port was started. This project was completed in 1943 having refilled about 60,000 cubic meters of the marsh. About 1,532 people were served by this plan.

Atiquizaya

In 1942 two systems of paved canals were constructed, but due to lack of maintenance and inundations this work was lost. In 1947 these canals were reconstructed making usable 1,800 meters of canal. For its maintenance there is one worker paid by the Director-General of Sanitation. This served about 6,361 people.

Santa Ana

In 1947 a canal of concrete and clay bricks was constructed for the purpose of draining a swamp found to the north of the city. This network consists of 270 meters of canals with intersections and flagstones of concrete, and of 216 meters of subterranean drainage with cement conduits of different diameters. For its maintenance there is one employee paid by the Director-General of Sanitation. 50,375 people have benefited from this project.

CONTROL WITH D.D.T.

In November, 1946, anti-malaria control with D.D.T. was initiated in the country, by spraying a 5% D.D.T. solution every six months on the walls and ceilings of all the homes within the locality treated.

Since 1948 a record of the cost of material and manual labour for each locality has been kept, and this control has been so perfected that the calculations of the cost of the project shown in Table 1 attached can be considered accurate. Attached is also a list of the municipalities treated.

/Ilopango

Ilopango

The first application began in November, 1946, and up to the present eight sprayings, carried out every six months, have been effected in all homes in the municipality. 1,060 people have benefited.

Acajutla

The first application began in December, 1946, and has been repeated every six months. Up to the present five sprayings have been effected. 1,532 people have benefited by this spraying.

La Libertad

The first application began in February, 1947, and has been repeated every six months. To date four sprayings have been made. 2,158 people have benefited.

Netapan

The first application was made in August, 1948. Three sprayings have so far been made. 1,979 people have benefited.

Texistepeque

The first application was made in August, 1948. Three sprayings have so far been made. 1,041 people have benefited.

Jiquilisco

The first application was made in November 1948. Two sprayings have so far been made and 6,305 people benefited.

San Bartolo, Apulo and Nahuilingo

For each of these municipalities two sprayings have been made during the current year. 2,502 people have benefited.

14 localities, with a total of 119,477 inhabitants, have benefited by these permanent sanitary projects or by D.D.T. spraying since 1932 up to the present date. This effort, though efficient as it has been and impressive as it may seem, has not been sufficient nor by any means widespread enough in the light of the magnitude of the problem on hand.

RESUME

The aim pursued by our projects has been the reduction of the malaria index to such an extent that this parasitic disease ceases to be the national scourge in the near future.

/For this objective

For this objective to become a reality is without a doubt one of the major contributions that could be made towards the general wellbeing of the Salvadoreans. We think that to solve a problem of such magnitude it is necessary to have a programme that would be both extensive and lasting, and which would be effected in municipalities of moderate as well as high endemic and hyperendemic zones. We think that it is important to insist that this project be extended to the rural areas, since, as we have said before, agriculture constitutes the source of wealth in our country.

With the existing equipment and with sufficient funds, we could protect and so aid the public in endemic zones to the extent that malaria would cease to be a stumbling block for the present and future plans of national recovery.

The two main resources, which the Malariological Service counts on to realize its objective, are: medication (Aralan-Paludrine) and domestic DDTization.

In general medical attention given to patients with malaria does not constitute a prophylactic measure; it is instead a medical measure which achieves only immediate relief for the affected individual. This objective is generally reached by the administration of chloroquine in doses of 1.50 grams of salt for adults, and in smaller doses for children according to their ages. These treatments are given en masse in clinics and dispensaries. In order to make this measure more efficient, it is imperative that the malarial population have easy access to these medical centres. We have set up an organization for the distribution of medicine from schools, police or governmental centres, in those regions devoid of clinics, dispensaries and pharmaceutical houses.

The other medium of our campaign on which we count, since we prefer to combat the adult mosquito instead of the larvae, is the application of D.D.T. in the homes. For the greatest effect we should have a campaign that is carried out throughout 154 municipalities; among these are included those localities which are considered moderately endemic, highly endemic and hyperendemic. A programme of such broad scope is beyond our financial resources.

PLAN OF OPERATIONS WITH UNICEF FUNDS COMPLEMENTING
THE FUNDS OF THE GOVERNMENT OF EL SALVADOR.

Since an anti-malaria project carried out in moderate, high endemic and hyperendemic zones would raise the cost to several hundred thousand dollars, a figure beyond our financial reach, we have decided to organize an anti-malaria programme in the hyperendemic zone only, in order to use UNICEF's contribution to the best advantage. This would include the rural as well as the urban population and would benefit a total of 254,726 people.

The benefits of a programme of that nature would not only be to eliminate malaria but also, as shown in other countries, an appreciable percentage of enteric infections, which are the main cause of the high infant mortality rate.

For the execution of the plan we have thought it best to create two types of crews: Type "A" and Type "B".

/Crew Type "A"

Crew Type "A"

Each crew type "A" will be made up of 1 Chief, 1 driver in charge of the equipment and 6 sprayers. It will have 1 two-ton truck with propulsion in four wheels, 1 sprayer on truck with gasoline motor, 10 morral sprayers. This type of crew will be in charge of spraying in urban centres that are easily accessible. Eight crews of this type will be created.

Crew Type "B"

Each crew type "B" will consist of the following personnel: 1 Chief driver and 4 sprayers. The equipment of this crew will comprise 1 pick-up of 1 ton with propulsion in 4 wheels and 6 morral sprayers. This crew would carry out DDTization in the rural areas where homes are far apart and not easily accessible. Three crews of this type will be created.

Personnel

In addition to the Chief of this project, personnel already existing and crew personnel which will be picked and trained in a central station; there will be one Inspector General who would reside in San Salvador and would be in charge of the crews, shipment of material and equipment, as well as administrative personnel and a secretary.

Equipment

The equipment will consist of 8 trucks of 2 tons each with propulsion in 4 wheels, 3 pick-up trucks of 1 ton with propulsion in 4 wheels, 8 sprayers on wheels with gasoline motor and 90 morral sprayers, in addition to the protective equipment of each worker.

Material

The material considered necessary is based on past D.D.T. programmes carried out in our country (Table 1 attached), as well as on experience gained in other countries as to the use of soluble or suspension insecticides.

We have also considered the necessity of using other insecticides mixed with D.D.T. in order to avoid building up immunities to D.D.T. and the consequent growth of D.D.T. resistant factors.

Experience in this country has shown us that we cannot eliminate completely the use of dissolved D.D.T. due to the energetic use by the people of D.D.T. suspensions in the treatment of their homes.

The material will be sent from a central station by each crew to the location requiring it.

/ COMMUNITIES

COMMUNITIES SUBJECTED TO DDT TREATMENTTable No. 1

<u>Community</u>	<u>No. Inhabi- tants</u>	<u>No. Homes</u>	<u>No. Sq. meters sprayed</u>	<u>DDT Used</u>	<u>Men Working Days</u>	<u>Cost of Spraying</u>
Llanpango	1,674	265	105,165	185	60	1,237
San Bartolo	291	64	25,397	16	6	98
Apulo	614	141	55,954	35	18	219
La Libertad	2,792	368	200,019	247	84	1,998
Acajutla	2,707	352	93,291	174	80	1,278
Mahuilingo	812	185	73,415	66	32	448
Metapan	2,591	467	204,133	317	88	2,412
Texistepeque	1,063	205	69,004	101	48	684
Jiquilisco	3,624	675	267,867	260	104	1,996
	16,168	2,722	1,094,245	1,401	520	10,370

AVERAGE:

<u>Number of Inhabitants Per Home</u>	<u>Number of Sq. Meters Per Home</u>	<u>DDT in m² grams</u>	<u>Cost Per Inhabitant</u>	<u>Cost per Sq. Meter</u>
5.93	402	1.28	¢ 0.64	¢ 0.0094

TABLE NO. 2

WESTERN ZONE.

<u>States</u>	<u>No. of Inhabitants</u>	<u>No. of Homes.</u>	<u>No. Sq. Meters</u>	<u>DDT Kgrs.</u>	<u>Working Days</u>
Ahuachapan	5,139	866	349,132	522	166
Santa Ana	44,017	7,432	2,988,016	4,482	1,427
Sonsonate	5,973	1,007	404,814	606	194
	55,129	9,296	3,740,992	5,610	1,787

CENTRAL ZONE

La Libertad	31,287	5,276	2,120,952	3,182	999
San Salvador	6,154	1,036	416,472	624	199
Chalatenango	25,722	4,336	1,743,072	2,615	834
La Paz	7,516	1,267	509,334	764	243
San Vicente	25,549	4,308	1,731,816	2,597	828
Cabanas	6,110	1,030	414,060	621	198
	102,329	17,253	6,935,706	10,403	3,301

EASTERN ZONE

San Miguel	5,239	883	354,966	532	170
Usulután	22,352	3,769	1,515,138	2,272	724
La Unión	13,349	2,251	904,902	1,358	432
Morazan	5,780	975	391,950	588	187
	46,720	7,878	3,166,956	4,750	1,513

/RESUME

RESUME

<u>ZONES</u>	<u>No. of Inhabitants</u>	<u>No. of Homes.</u>	<u>No. Meters Sq.</u>	<u>DDT Kers.</u>	<u>Working Days</u>
WESTERN ZONE	55,129	9,296	3,740,992	5,610	1,787
CENTRAL ZONE	102,329	17,253	6,935,706	10,405	3,301
EASTERN ZONE	46,720	7,878	3,166,956	4,750	1,513
	204,178	34,427	13,843,654	20,765	6,601

PROPOSED BUDGET FOR UNICEF FUNDS
FOR AID TO THE DEPARTMENT OF SANITATION OF THE REPUBLIC OF EL SALVADOR
FOR ITS DISINFESTATION PROGRAMME

4 Jeeps (Station Wagon) at \$1,750 each.....	\$ 7,000.
2 Pick up at \$2,000 each.....	4,000.
100 Dobbins Sprayers Model 44GS, Trademark YNAWU of 4 gallons at \$8.90 each.....	890.
160 Gaskets Oil Resistant for No. 44 GS Sprayers Dobbins.....	48.
80 Bronze Extension Rods Dobbins 24".....	40.
300 Feet of Hose, Oil Resistant, 3/8" Dia. Dobbins.....	90.
100 Nozzles 8002 Spraying System Co. Chicago 24, Illinois.....	180.
446,000 Pounds DDT 75% Wettable.....	84,000.
10 Entomological Lenses with 20 Increases.....	41.5
75 Raincoats, Medium Size.....	675.
70 Helmets, Medium Size.....	70.
500 Bulbs General Electric or Phillips 3.8 volts.....	25.
480 Eveready batteries for hand lamps.....	29.
1 Adding Machine, small.....	100.
1,000 Yards of Material for Uniforms.....	<u>2,000.</u>
	TOTAL..... \$ 99,189.

RESUME OF TOTAL COST OF PROGRAMME

Personnel	Colones 146,200
Equipment	133,392
Materials	<u>147,435</u>
	(approx. US \$ 171,000) Colones 427,027
	(Includes UNICEF contribution.)

PROPOSED PLAN FOR THE DEVELOPMENT OF AN INSECT CONTROL PROGRAMME
IN THE REPUBLIC OF GUATEMALA *

General Data

The Republic of Guatemala has an area of 109,000 square kilometers, with a population of 3,800,000 inhabitants. Its geographical distribution comprises 22 departments which are divided into a total of 315 municipalities. The population increased by 50.3% from 1920 to 1940.

Importance of the problem

In Guatemala, diseases propagated by insects are the greatest cause of morbidity and mortality, with malaria, enteritis and typhoid fevers predominating. It is to be noted that the infant mortality rate is one of the highest, having reached 250 due to the causes mentioned above.

Children are particularly susceptible to malaria which causes a high death rate among them, affects their physical and mental development and makes them subject to other diseases, such as tuberculosis especially.

This disease is an important cause of abortion, premature births, stillbirths, maternal and puerperal deaths, and therefore places the lives of children and mothers in grave and direct danger. Men avoid areas affected by malaria, and persons working in such areas show a very low productivity rate due to the action of the parasite. The inhabitants, mainly mothers and children, also suffer indirectly because of the lack of food and, in general, due to economic deficiency caused by low productivity of the workers.

In Guatemala there are about 500,000 persons suffering from malaria.

The presence of Aedes aegypti along the coasts of Guatemala and the high susceptibility of the population to yellow fever because of the non-existence of immunity to it, is a menace which becomes greater and greater as the infection is creeping up from South America to the North.

Fortunately for humanity, DDT, the powerful scientific weapon at hand, can eradicate many of the mentioned diseases and by this means lower morbidity and mortality rates, defend the infant population, and increase the economic index of the country, inasmuch as a healthful people is able to produce more, thereby raising its health level.

Of the 315 municipalities of the Republic of Guatemala, 160 pay high tribute to malaria. Eighty to 85% of the population has malaria, the children being the most affected and therefore the increase in infant death rate.

*Provisional Translation from Spanish.

II - (d)

Present and Past Work

In January of 1948 the 5% residual DDT Campaign was started in the Republic. For this work the Government assigned 60,000 Quetzales to be used during 1948 and the first half of 1949. It may be said with real pleasure that the Campaign has been so successful as was hoped, as statistics show that the work done in some localities has lowered the morbidity and mortality rates, and in this decrease, the greatest benefits have shown up in infant mortality.

As a note of information, in 1948, 5,888 houses were sprayed, 12,214 persons protected, 1,409,190 square meters treated with 5% DDT, at a cost of 34,410 quetzales, including all expenses for equipment, material, transportation and labour.

The work proceeds on an ascending scale this year, in accordance with the present budget. However, it will not be possible to obtain, as it is desired, an extension of the Campaign throughout the Republic, with the present facilities.

Application of DDT to houses is done with several squads composed of five persons each, working under the supervision of an Inspector. Each worker sprays an average of 10 houses per day. The DDT is sprayed on the inside walls of the houses with special sprayers. The squads are usually transported in station wagons, but they also use mules, boats and railways. Five-percent wettable DDT (suspension in water) is used. Walls thus treated remain toxic for the mosquitoes for from 6 to 8 months, and for other insects during periods varying according to their kind.

The type of wall has a special influence on the residual toxicity of DDT. Assistance from the UNICEF will make possible the extension of the Campaign for the protection of all the population.

The Office maintains records of the work and they are and will continue to be at the disposal of UNICEF.

Expansion of present programme.

The DDT will also be used for the purpose of eradicating typhus fever by means of its application to persons in the endemic area. It has been used in Guatemala on a very small scale but with better results than with vaccine, which confirms results obtained in other countries. With the help of UNICEF, DDT can be used on 500,000 persons.

Furthermore, the application of DDT on the walls of the houses will be accompanied by its application in water reservoirs. This measure will permit the eradication of the Aedes aegypti and prevent the possible infiltration of yellow fever in the communities. At the same time the muscidae infestation will decrease by the use of DDT, aided in certain cases by Chlordane.

All the houses and stables in areas affected by malaria, and all people in areas affected by typhus fever, will be treated with DDT.

/The development

The development of the plan shall be made by the Department of Public Health under the supervision of duly trained technicians from the magnificent school of Malariology of Maracay, and with the assistance of a representative of the World Health Organization, through the Pan American Sanitary Bureau.

Attached are data on personnel, the most important material, and budget for the work, and that which is needed in order to complete the programme, embracing all the areas infested with insects responsible for the mentioned problems.

CONTROL OF RESULTS

Malaria and Aedes Aegypti

The control of the results shall be made by investigation for the presence of mosquitoes, by means of the capture service, from 3 to 8 months after application of DDT within homes. Captures shall be made in one-third of the total number of houses and only in the bedrooms. Captures shall also be made in houses separated by more than 50 meters, in the larger rooms of the house where there are no bedrooms and also in boats. The presence of aegypti, after the application of DDT in the house, will indicate a deficiency in the work done and will demand a search for hidden breeding places or another application of DDT in areas still infested. The presence of Anopheles, generally, or of the species proved to be responsible for the transmission of malaria in the area treated, especially when the vector carries hematozoic specimens, shall be considered as a result of deficient work.

Typhus

Control shall be made through the capture of lice on persons before and after DDT treatment, and by comparison of the results.

Morbidity and Mortality

Morbidity and mortality rates, especially those due to malaria, before and after DDT applications, shall be compared and the results will serve as a guide for the work.

Work deficiencies shall be duly rectified by the directors of the campaign and by the technical assistance of the Pan American Sanitary Bureau (Regional Office of the World Health Organization.)

/Budget

Budget

SUMMARY OF CONTRIBUTIONS

U.S.\$

Government of Guatemala	516,987.00
UNICEF	<u>93,103.00</u>
	610,090.00

CONTRIBUTIONS FOR THE CAMPAIGN

1. Government of Guatemala

Personnel (Anti-Malarial, DDT, and Typhus Sections)

4	physicians
2	laboratorists
3	secretaries
4	typists
2	general inspectors
4	chief guards
43	guards
10	chauffeurs
1	interne
4	assistants
<u>1</u>	office servant

78 total employees

Budget

Personnel (including increase for new programme)

1950	175,380.70
1951	<u>175,380.70</u>

U.S.\$

Sub-Total 350,761.40

Material

1950	83,112.80
1951	<u>83,112.80</u>

166,225.60

TOTAL

516,987.00

/The budget

The budget item for material contributions of the Government may be used, if necessary, for traveling expenses and personnel. The Government of Guatemala shall grant additional amounts, if necessary, in order to guarantee the perfect utilization of the UNICEF aid.

The Government shall also furnish all office facilities, shall supervise and control the application and conservation of material supplied by UNICEF and agrees to proceed with the carrying out of the programme when the UNICEF aid is finished.

All existing or material acquired by the Government of Guatemala for the campaign against malaria, the aegypti and typhus shall also be at the disposal of the DDT campaign.

2. UNICEF (1950-1951)

U.S.\$

Malaria and Aedes Aegypti Section

6	Jeep station wagons, 4 wheel drive	10,500.
2,100	Drums containing 100 to 200 lbs. of powder DDT 75% according to the attached specifications.	70,000.
100	Dobbins sprayers, according to the attached specifications.	1,067.
100	8002 nozzles according to the attached specifi- cations.	180.
100	Dobbins shut-off nozzles 71E model.	150.
100	Gaskets, oil resistant, for 44 SS Dobbins bulbs	30.
100	Dobbins extension rods, 24 inches.	50.
300	Dobbins hose, oil resistant, 3.8 ft. in diameter.	90.
2	Binocular entomological microscope.	400.
50	3 Battery-flashlights, Bond, Eveready or Winchester for screw bulb.	50.
960	Eveready batteries for flashlights.	96.
350	General Electric bulbs 3.8 volts and 0.3 amp. with screw	35.
150	Pression bulbs with screw.	15.
1000	Pounds of 100% DDT.	250.

Typhus Section

3	Jeep station wagons, 4 wheel drive	5,250.
56,000	Pounds of DDT 10% for dusting people.	4,940.
		10,190.
	TOTAL	\$ 93,103.

/3. WHO/PASB

3. WHO/PASB

The WHO/PASB shall lend necessary technical assistance without cost to UNICEF and to the Government of Guatemala.

Dr. Luis F. Galich
Director-General
of Public Health

Dr. Adhemar Paoliello
Representative of WHO/PASB

PROPOSED PLAN FOR THE DEVELOPMENT OF AN INSECT-CONTROL PROGRAM

HONDURAS

General Information

Area	153,226 square kilometers
Population	1,200,800 inhabitants
Capital: Tegucigalpa	86,000 "
Principal Cities	
San Pedro Sula	22,000 "
La Ceiba	12,200
Santa Rosa	8,000
Choluteca	5,300

Transportation

All of the southern, central, and eastern sections of the country are accessible by roads. The western section is accessible partly by roads, and largely by air. One fifth of the country, in the eastern section, is unpopulated.

Illnesses transmitted by insects

The principal causes of death in the country are malaria, intestinal parasites and intestinal infections. The death rate caused by malaria is 330 for 100,000 inhabitants.

As in the other Central American Republics, the children are the principal victims, not only in morbidity, but also as to mortality.

The other problem is the transmitter of yellow fever, which is now found all over the country. To date, six communities have been inspected, and since July 1949, five were found positive. For over a quarter of a century, no cases of yellow fever had been reported, so that, in Honduras, as well as in the other Central American countries, the majority of the people are susceptible to yellow fever. Honduras also suffers the threat of this infection, which has crossed the Panama Canal on its way northward.

Present conditions

The present economic conditions have not permitted the execution of a large scale work plan for the combatting of the high mortality rate among children. The Government, with the collaboration of the Institute of Interamerican Affairs, through the Interamerican Cooperative Service of Public Health, did start, however, a program in 1946, which, to the present moment, does not include the entire country. The projects, which are very well orientated, have as a final objective the eradication of malaria through the use of DDT in the homes. The results have been excellent, but work has been carried out in only two localities. In reference to *Aedes Aegypti*, the Government with the technical assistance of the Pan-American Sanitary Bureau and of the Interamerican Cooperative Service of Public Health started a campaign in July 1949 based on the application of DDT in the water deposits. The project, due to lack of funds, has not progressed as would be desired.

Measures necessary to

Measures necessary to solve the problems

Increase with the aid of UNICEF the material on hand, in accordance with the budget presented later.

Treat the walls of the homes in the areas scourged by malaria or aegypti, or by the two of them. DDT will also be spread over water deposits.

The projects will be executed by the Interamerican Cooperative Service of Public Health in accordance with the stipulation of the Work Agreement, that will be prepared and executed as was stated in the Basic Agreement of SCISP, with the technical assistance of the World Health Organization, through the medium of the Pan American Sanitary Bureau.

Through these we hope to eradicate Aegypti, control malaria and lower the morbidity and mortality rate in general, especially among children. The Interamerican Cooperative Service will increase its personnel in the first quarter of the year 1950 and still more in the fiscal year 1950-1951 and the first quarter of 1952, in order to execute these programs with complete efficiency.

The personnel of our anti-aegypti campaign will be reduced in order to employ a part of same in the DDT-ization campaign.

SCISP (Interamerican Cooperative Service of Public Health) will be able to decrease the amount of material distributed, but will increase the amount to be spent for gasoline, oil, stock and reparation of trucks. SCISP will also increase the amount allotted to viaticum.

Check of Results

A check will be made of the results, by the investigation of the presence of mosquitos, made 3 to 8 months after the DDTization of the homes. The test will be made in one third of the total homes, and only in the bedrooms. Tests will also be made in homes that are more than 50 meters apart, as well as in the forests. The presence of aegypti, after DDTization has been carried out, will prove that the spraying was not successful, and new DDTization of the infected areas will be performed. The spraying will also be considered unsuccessful if there is any presence of the anopheles mosquito or the alberque Hematozoarios carrier.

The mortality and morbidity rates, especially that of malaria, before and after DDTization, will be taken and will serve as an index of the success of the project.

Any deficiency of the projects will be corrected by the Directors of the campaign, through the technical assistance of the Pan American Sanitary Bureau (Regional Office of the World Health Organization).

Notes

1. Batteries for hand lamps should be sent in lots of 480 every five months.
2. The quantity requested by Honduras is smaller than that requested by Guatemala,

/Costa Rica and

Costa Rica and Nicaragua because

- a) The program does not require equipment for water travel, as is necessary in Nicaragua.
 - b) We do not have the problem of filaria, typhus and Chagas sickness.
 - c) SCISP also serves as additional aid in solving our problems.
3. SCISP also agrees to send two of its experienced inspectors as teaching inspectors to other countries for a maximum six month period without expense to SCISP.
4. DDT will be sent, divided into three lots. One is for Tegucigalpa, one for Puerto Cortes, and another for Ampala; all of which would be consigned to SCISP.

Tegucigalpa, D. C. (Honduras, C.A.)

5 October 1949

Cecilio Colindres Zepeda
Sub-Secretary of State in
charge of the Ministry of
Government, Justice, Sani-
tation and Welfare

Dr. Adhemar Paoliello
Representative of the
Pan American Sanitary
Bureau (Regional Office
of the World Health
Organization)

Miss Alice Christine Shaffer
Representative of UNICEF

J.L. Hummel
Temporary Director of SCISP

PRESENT FACILITIES FOR THE INSECT CONTROL CAMPAIGN

All the projects undertaken in the insect control campaign are to be carried out by the Interamerican Cooperative Service of Public Health (SCISP). The work against *Aedes aegypti* is to be effected by the Sanitation Department under the supervision of the Interamerican Cooperative Service of Public Health.

Personnel:

1 Chief of Division
1 Secretary
4 Supervisors
5 Permanent inspectors
12 Temporary inspectors
2 SPRAYERS

25 Total

Principal Materials:

4 sprayers - "Myers" and "Smith"
500 lbs. of DDT 100%
200 lbs. of DDT 50% wettable
20 hand lamps 3 batteries "Winchester"
100 batteries for hand lamps
50 bulbs
1 entomological microscope

Budget

Personnel	US	\$ 9,750.00
Material		5,000.00
Viaticum		1,750.00
Future expense		<u>5,100.00</u>
TOTAL		\$ 21,500.00

PRESENT NEEDS REQUESTED FROM UNICEF FOR THE AMPLIFICATION OF THESE PROJECTS

100 drums of DDT 100% (200 pounds each)	US \$ 5,000.00
265000 pounds DDT 75%wetttable	66,160.00
4 jeeps, pickup	7,200.00
3 jeeps (station wagon)	5,100.00
80 sprayers DOBBINS, model No. 44GS code YNAWU of 4 gallons	711.20
80 nozzles (shut-off nozzles) DOBBINS, model 71T	120.00
160 Oil resistant gaskets for sprayers No. 44GS, DOBBINS	48.00
80 Bronze extension rods DOBBINS 24 inches	40.00
300 feet of hose, oil resistant of 3/8" diameter, DOBBINS	90.00
100 Nozzles 8002 Spraying System Co., Chicago 24, Ill.	180.00
2400 Batteries for hand lamps - Eveready	145.00
1200 Bulbs for hand lamps - 3.8 volts, screw type	60.00
1 Microscope with binocular, Bausch & Lomb, model CTAS, No. 56700, A.S. Aloe	299.00
10 Entomological lenses for 20X	41.50
50 Helmets, Tropical medium size	50.00
	<hr/>
TOTAL	\$ 85,244.70

II - (e)

Contributions from the Government of Honduras

(Interamerican Cooperative
Service of Public Health - SCISP)

<u>1950</u>	US\$	
Personnel	9,750.00	
Material	5,000.00	
Viaticum	1,750.00	
Eventual expenses	<u>5,100.00</u>	
	TOTAL:	21,500.00
 <u>1951</u>		
Personnel	9,750.00	
Material	5,000.00	
Viaticum	1,750.00	
Eventual expenses	<u>5,100.00</u>	
	TOTAL	<u>21,500.00</u>
	GENERAL TOTAL	128,244.70

The distribution of material and future funds from SCISP will be used for extra personnel and viaticum. The Government of Honduras will give additional funds, if necessary to maintain an effective utilization of UNICEF aid and will guarantee the continuance of a program after UNICEF's aid is terminated.

The Government will also contribute office facilities and will guide and control the application and conservation of the material supplied by UNICEF and will see to the continuance of the program when UNICEF's aid has ceased.

SCISP and the Government of Honduras also put at the disposal of the campaign all the material already existing or acquired for the insect control program.

WHO/PASB

WHO/PASB will give the technical assistance needed for the development of the program without any expense to UNICEF, SCISP, and the Government of Honduras.

PROPOSED PLAN OF OPERATIONS FOR AN INSECT CONTROL PROGRAM IN THE
REPUBLIC OF NICARAGUA *General Data:

The Republic of Nicaragua has an area of 148,000 sq. kilometers with a population of 1,155,000 inhabitants, whose geographical distribution takes in 15 states which are in turn divided into 122 municipalities. Managua, capitol of the Republic, has 130,000 inhabitants; the second city of importance is Leon with 40,000 inhabitants; Granada with 26,000 inhabitants; Masaya with 25,000 inhabitants; Matagalpa with 20,000 and Chinandega with 18,000. These are the most important cities of the Republic.

Illnesses transmitted by insects.

All the territory of Nicaragua is plagued by malaria. The most elevated city is Jinotega, which is at an altitude of 3,000 feet. Even this city has a high morbidity and mortality rate due to malaria.

The mortality rate due to malaria is nearly 272 for every 100,000 inhabitants throughout the country.

Parasitosis attacks children with most frequency. The infantile mortality rate is 23.3 per thousand. Intestinal infections are also very common.

Filaria is not among the principal causes of death, but it still presents a high morbidity rate in the Republic.

The Chagas sickness has also penetrated into Nicaragua requiring preventive action in order to keep it from becoming the serious problem it is in the other countries of South America.

Malaria and filaria are two factors which reduce the productivity of the people of the country.

Nicaragua does not have the problem of typhus, but the malaria rate is one of the highest in the Americas.

As in the other countries of Central America, Nicaragua suffers the threat of yellow fever, which keeps getting closer. For more than a quarter of a century no cases were found in the country. The susceptibility of the people to this sickness is thus very high. The diffusion of its carrier is greater than in the other countries of Central America, due to the fact that the people live at an altitude of less than 3000 feet in a warm climate.

Present measures

Due to the economic conditions of the country, a systematic campaign against malaria has never been carried out. The Ministry of Public Health requested \$ 3,000,000 (three million cordobas) (about 600,000 dollars) for the Budget, but due largely to a decrease in the coffee harvest, basic product of the national economy, this request was not granted. In addition the Department of Health had to reduce its personnel and the salaries of the remaining personnel.

*Provisional translation from Spanish

/The campaign

The campaign against the yellow fever carrier is being undertaken in a limited manner in conjunction with the Sanitary Inspection Department. This procedure does not solve the problem of eradicating the aegypti which is a relatively easy task but instead confuses all the more the work of the Sanitary Inspection Dept. With a specially trained personnel for the anti-aegypti campaign it will facilitate the eradication of same and it will permit afterwards the utilization of the same personnel in other problems of Public Health.

Nicaragua already has some experience in the DDT-ization of the homes but without precise systematization. The application of insecticide is made only in the homes of persons that can pay for the DDD-ization, thus giving unsatisfactory results since the projects are incomplete.

Necessary measures for the solution of the problems.

The material solicited from UNICEF will permit the DDT-ization of the homes in all the areas affected by any one of the following health problems:

Malaria, Aegypti, Filariasis, and Chagas Sickness

The projects will eradicate the aegypti and will avoid the danger of yellow fever in the communities, since infection of the epidemic type is expected to penetrate the country.

It will control if not eradicate malaria, solving in this way, the most important sanitary problem in the country. It will control filariasis and will lower the mortality caused by intestinal infections.

All this will permit an increase in the birth rate, an increase of the population, greater productivity and better economic conditions in the country.

The technique to be developed in the DDT-ization of the homes will be that mentioned in the plan already proposed for Guatemala. Instructions will be sent by the Minister of Public Health to the Doctor who is matriculating in a course on malaria in Maracay, Venezuela, so that he will proceed to Barquisimeto, Venezuela for training in the anti-aegypti projects.

The personnel of the anti-aegypti campaign will be employed exclusively for this work, however, their number can be reduced as a consequence of the DDT-ization in the homes. In the same way the personnel of the Sanitary Inspection Department will be able to be reduced.

DDT will be sprayed on water deposits, and all the homes without exception will be treated. This includes even the isolated homes of the rural areas.

The National Government of Nicaragua will increase the amount set aside for the Sanitation of the Home Section from that given it in the Budget of the past fiscal year. In the division of material, it will increase the quota for gasoline, oil and supplies for motor vehicles. The viaticum will remain, through preference, under the charge of the Municipal governments.

The personnel of the DDT-ization campaign should receive good salaries so that it will permit them to develop an efficient production and one that takes full advantage of the UNICEF aid.

/The National

The National Government will provide a special credit to supplement the Budget for the First Semester of 1950 in order to make possible the development of the program from the beginning of the coming year.

In addition to the doctor that is being trained in Maracay, Venezuela, Nicaragua, has another doctor already trained, in Maracas and San Cristobal, Venezuela, on Anti-Malaria campaign and on the campaign against the transmitter of yellow fever. It is of convenience to these technicians, jointly with the Chief of the Sanitation Section of the vicinity, that they be given the charge of the direction, administration and supervision of the development of the insect control campaign.

The World Health Organization will give, through its Regional Office, the Pan-American Sanitary Bureau, the necessary technical assistance for the campaign.

Record of Results.

A record of the results will be made in the investigation of the presence of mosquitos through the Investigation Service. This investigation will be made from three to six months after the DDT-ization of the homes. The test will be made in a third of the homes only in the bedrooms. Houses separated by more than 50 meters will also be tested. The presence of Aegypti after the DDT-ization of the home will indicate that the project was not properly executed and will require the search for hidden larvae or a new DDT-ization of the area infested. It will also be considered a failure if there is present, in great numbers the Anopheles mosquito, or of the species responsible for the transmission of Malaria, especially when the transmitter has a high hematocytosis percentage.

Tests will be made before DDT-ization in order to determine the areas affected by Filaria and to find out the percentage of infected mosquitos. The percentage of those found infected after the DDT-ization will give us a basis for the comparison of the results of DDT-ization in relation to Filaria. In addition, tests will be made before the DDT-ization of areas affected by Chagas illness, in order to obtain the following data:

1. Percentage of homes with live Hemipterous insects.
2. " " " " dead " "
3. Rate of live Hemipterous insects per home.
4. " " dead " " " "
5. Presence of live Hemipterous insects infected with Trypanosome.

After the DDT-ization several tests will be made in the same area for comparison of the results obtained by the applications of insecticide.

The mortality rate before and after DDT-ization will be compared and will serve for orientation of these projects.

MATERIAL ON HAND FOR THE INSECT CONTROL CAMPAIGN

The campaign will be undertaken by the Sanitation Department of the area. This will include an Anti-Malaria Campaign and Sanitary Inspection throughout the Republic.

Personnel for the Anti-Malaria Campaign

Inspector General	1
Secretaries	2
Drivers	3

Sub-total 6

One Chief Supervisor (Guard)	1
Office Assistant and Draftsman	1
Chiefs of Crews	10
Operators	50

Sub-total 62

Personnel for Sanitary Inspection

Local Inspection Chiefs	10
Inspection Guards	2
Local Inspectors	40

Sub-total 52

TOTAL.....120

Principal Material

Small Truck	1
Truck	1
Typewriters	3
Calculators, Hand	2
Typhus Machine	1
Electric Hand Lamps	60
Batteries for Same	100
Spark Plug for Lamps	100
Sprayers	24
Microscopes (1) Entomological	2
Lupus Erythematosus Machine	1
DDT 5% solution in Kerosene	1.200 gallons

Budget from July 1949 to June 1950

Material	US\$ 5,000.00
Viaticum and Miscellaneous	" 12,700.00
Personnel	" 48,000.00

Total ...US\$65,700.00

REQUIREMENTS FOR AN EXTENSIVE AMPLIFICATION OF THE INSECT CONTROL PROGRAM

320,000 lbs. DDT 75% mettable	\$ 80,000.00
2 launches	18,000.00
4 jeep station wagons	7,000.00
2400 flashlight batteries	145.00
1200 flashlight bulbs	60.00
400 meters synthetic oil-resistant hose	480.00
100 sprayers	4,250.00
25 raincoats	225.00
100 shut-off nozzles	110.00
300 atomizing nozzles	300.00
300 gaskets for sprayers	150.00
300 gaskets for nozzles	15.00
200 drums 100% DDT	1,000.00
4000 gals. Xylol	6,100.00
300 gals. Triton X-100	876.00
technical assistance	1,600.00
	<u>\$120,311.00</u>

SUMMARY OF CONTRIBUTIONS

1. UNICEF	1950 and 1951		\$120,311.00
2. GOVERNMENT OF NICARAGUA	1950		
	Material	5,000.00	
	Viaticum & future expenses	12,700.00	
	Personnel	<u>48,000.00</u>	
	Total		65,700.00
	1951		
	Material	5,000.00	
	Viaticum & future expenses	12,700.00	
	Personnel	<u>48,000.00</u>	
	Total		<u>65,700.00</u>
	GRAND TOTAL		<u>131,400.00</u>

The items, material and future contributions of the Government, may be used, if necessary, for extra personnel and viaticum. The Government of Nicaragua will

/contribute additional

contribute additional sums, if necessary, to achieve a perfect utilization of UNICEF aid, and will guarantee the continuation of the program after UNICEF aid is terminated.

The Government will also contribute office facilities, and will direct and control the application and conservation of the material supplied by UNICEF.

All the material already existing or acquired by the Government of Nicaragua for the insect control program will be put at the disposal of the Campaign

3. WHO/PASB

WHO/PASB will lend all necessary technical assistance, without cost to UNICEF and to the Government of Nicaragua.

Dr. Alejandro Sequeira Rivas
Colonel (CM) G.N.
Minister of Public Health

Dr. Adhemar Paoliello
Representative WHO/PASB