The Independent Chairman transmits for the consideration of the Joint Coordinating Committee, at its second session, the World Health Organization's report on the activities of the Onchocerciasis Control Programme. This document covers the period January-September 1975; the activities carried out during October-November will be reported at the session.
ONCHOCERCIASIS CONTROL PROGRAMME IN THE VOLTA RIVER BASIN AREA

PROGRESS REPORT

January - September 1975

presented by the World Health Organization
as Executing Agency

A. INTRODUCTION

1. At the first session of the Joint Coordinating Committee which took place in Abidjan in February 1975, a report was presented by WHO, as executing agency, covering the first year of activities of the Onchocerciasis Control Programme. The establishment of the Programme Headquarters in Ouagadougou, including recruitment of staff, procurement of supplies and equipment and commencement of training activities, was described. The steps taken to build up an infrastructure of stores and offices throughout the Phase I area and to provide logistic support to the aerial operations were outlined. The JCC was informed that the aerial spraying operations had successfully commenced on 10 December 1974, but had been temporarily suspended due to the crash of both the helicopter and the fixed wing aircraft. Following the arrival of two additional helicopters in late January these operations were resumed on 10 February.

2. The assistance provided to the Programme by WHO Headquarters, and the activities undertaken by the OCP support unit were reviewed including the research already in progress, under-contracts negotiated with institutions in the Programme area and elsewhere, in the fields of epidemiology and chemotherapy, insecticide evaluation, vector cytology, Simulium population sampling and aquatic monitoring.

3. Members were informed of the action taken to set up the advisory bodies and the JCC approved the Memorandum of Understanding which sets out the principal features of the management structures not covered by the 1973 Operational Agreement.

4. It was clear that the objectives of the first year of the Programme had been met: the Headquarters of the Programme and infrastructure for Phase I were established and control operations had begun.

5. The present report covers the period from January 1975 to the end of September 1975; more detailed information is provided in the quarterly progress reports.2

B. MANAGEMENT STRUCTURES

6. Following the assurances received from Contributing Parties at the first session of the JCC, the Onchocerciasis Fund Agreement was signed by representatives of nine donor countries, the African Development Bank, IBRD, IDA, UNDP and WHO on 9 May 1975, at the World Bank Headquarters Washington, in the presence of Dr M. G. Candau, Independent Chairman of the JCC.

7. The Steering Committee for Onchocerciasis Control in the Volta River Basin area met three times during the period under review. Discussions at these sessions centred particularly on economic development and the progress of operational activities.

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2 OCP/PR/75.1, 2 and 3.
8. Seven members of the Scientific and Technical Advisory Committee visited the Programme area during May-June and reported on their observations at the second meeting of this Committee which took place in Geneva in June. The proposals for data storage and analysis, prepared by WHO in accordance with the recommendations made by the STAC at its first meeting were reviewed, and considerable attention was devoted by the Committee to research into the fields of chemotherapy and epidemiology. A number of recommendations were made in this regard.\(^1\) STAC members now receive quarterly reports on all ongoing research activities.

9. Members of the Scientific Advisory Panel participated in working groups to draw up protocols for insecticide evaluation (March) and aquatic monitoring (June). In line with a recommendation made by STAC at its first meeting, and following investigations by OCP into work currently being undertaken in this field, arrangements were made for a working group of SAP members to meet in Geneva in late October to study the question of the establishment of self-perpetuating colonies of *S. damnosum*.

10. A meeting took place in May between representatives of the sponsoring agencies and the Chairman of the Economic Development Advisory Panel (EDAP), to review the economic development aspects of the Programme and the role of the Panel. The Chairman of the Panel subsequently visited the Programme area to gain first hand information of the situation. It has been agreed that the membership of the Panel will be defined over the coming year as more data become available on the economic activities to be undertaken in the area.

11. The Ecological Panel had its third meeting during the month of August to study the revised aquatic monitoring programme. The report of this meeting\(^2\) reflects the Panel's concern at the duplication of effort between EP and STAC and stresses the need to clarify the roles of these two advisory bodies. This matter is under consideration and will be reviewed with representatives of both groups, at the third meeting of STAC in March 1976.

**C. IMPLEMENTATION OF THE PROGRAMME**

12. Vector control operations and entomological surveillance activities continued in the Phase I area. Preparations were made for the start of control operations in Ghana and Upper Volta (Phase II) including the development of the infrastructure, the purchase of equipment and supplies, and the recruitment and training of personnel. Epidemiological evaluation began in Upper Volta and was extended to Ivory Coast. Plans have been drawn up for epidemiological evaluation in Mali and Ghana.

13. Although the possibility of invasion of the control zone by *S. damnosum* from outside was foreseen in the PAG Mission report\(^3\) a greater number of adult flies was observed in the periphery of the Phase I control zone from May to August than anticipated.

14. After a review of the development of control operations, arrangements have been made to adjust the composition of the air fleet to give greater flexibility to spraying and surveillance over the coming year.

15. The first part of a management survey of the administrative and logistic support to the Programme has taken place and action is already being taken to implement some of the mission's recommendations.

16. **Office of the Programme Director:** The Programme Director met with officials of the Participating Governments on a number of occasions to inform them of the progress of activities and of any problems which had arisen. In particular, ways of overcoming delays in customs clearance of supplies at the main centres and at frontier crossing points were discussed and problems encountered in carrying out aerial larviciding operations in certain areas reviewed.

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\(^1\) JCC 2.3 Report of the Scientific and Technical Advisory Committee, Annex.

\(^2\) JCC 2.4 Report of the Ecological Panel.

\(^3\) OCP/73.1 Report of the Preparatory Assistance Mission to the Governments of: Dahomey, Ghana, Ivory Coast, Mali, Niger, Togo and Upper Volta.
17. Numerous visitors were received by the Programme Director, including national officials from Ghana and Niger who came to the area to gain first hand information on the Programme; STAC and EP members who were evaluating appropriate aspects of the Programme's activities; the Chairman of EDAP; and representatives of bilateral aid organizations, with whom discussions took place on matters of mutual interest such as volunteers and economic development activities. Other visitors included representatives from the sponsoring agencies, and from the international press and information media.

18. The Director participated in several meetings, including the River Niger Commission meeting in Niamey, the second meeting of STAC and the fourteenth session of the Steering Committee.

19. The post of administrative officer in the Director's office was filled, as anticipated, in the first half of 1975.

20. The preparation of a monthly news bulletin entitled "Oncho Flash", which receives wide distribution in the Programme area, was undertaken by the Information Communications Officer, who, in addition to providing articles and other material for use by the information media both in the Programme area and elsewhere, received, and arranged programmes for, all representatives in this field, including several television teams.

21. The Information Officer visited the seven participating countries to establish contact with representatives of national television, press and radio, and to discuss the diffusion of information regarding Programme activities. The possibility of holding an "Information Week" on onchocerciasis in the various countries was considered with national officials. Visits were also made to the Headquarters of the World Bank, in Washington, and the United Nations Development Programme, in New York, for briefing on the economic development aspects.

22. Other information activities included the preparation of a radio programme and the organization in Upper Volta of an evening symposium on the Programme.

23. Vector Control Unit: Aerial spraying operations have been carried out since February by three Bell 206 B helicopters equipped with a rapid release system specially developed for the Programme. A Turbo-Porter fixed wing plane, similarly equipped, joined the fleet in March 1975. A fourth stand-by helicopter was positioned by the subcontractor to ensure continuity of operations in the event of a temporary grounding of another aircraft, and was available to the Programme on a charter basis. Initially, 4 pilots and 2 engineers were provided by the subcontractor; later this number increased to 6 pilots and 3 engineers.

24. The Programme radiocommunications network linking the Programme Headquarters, Ouagadougou, and the main aerial base, Bobo-Dioulasso, with Tamale, Bole (Ghana), Korhogo, Bondoukou, Dabakala (Ivory Coast) and Sikasso (Mali), sectors and subsectors was set up during the first quarter of 1975. It was later extended to include Leo (Upper Volta) and Yendi (Ghana). Meteorological data was received regularly from the main airports of the zone of operations and the assistance received from the civil aviation authorities of the Programme area was satisfactory.

25. The infrastructure of airports, airstrips and helipads used for maintenance purposes as well as for refuelling and refilling with insecticide was extended with the establishment of additional facilities in Ghana, Mali, Upper Volta and Togo.

26. To ensure that the aircraft fuel supplied to all refuelling points scattered over the Phase I zone was of a reliable quality the main suppliers would use only new drums, with distribution from Abidjan; however, this resulted in an increase in the cost of fuel.

27. For reasons beyond the Organization's control, supplies of the special formulation of Abate insecticide used for larviciding were not always received sufficiently in advance to ensure smooth running of the operations and on several occasions the insecticide had to be airfreighted to, and within, the Programme area. Despite these difficulties all spraying operations were carried out as scheduled and the flight figures for the first year of the contract were as follows:
28. Insecticide applications are adjusted according to the water flow of the rivers which varies considerably at the start of the rainy season according to local weather conditions. The existing network of hydrological stations in the participating countries is being gradually extended to meet Programme requirements. So far, additional stations have been installed on rivers in Ivory Coast, Upper Volta and Mali. A river coding system for insecticide treatment and for the recording of larviciding data was established and progressively improved.

29. During the period under review, the aerial spraying operations proved extremely effective in controlling the breeding of S. damnosum in the rivers and streams of the Phase I zone. However, in spite of the satisfactory control achieved throughout the Phase I zone, S. damnosum females were found, sometimes in large numbers, in parts of the treated area. This phenomenon, which was particularly noticeable along the White Bandama, the Nzi, and at certain points on the Black Volta and Leraba rivers, began in May and continued through June, July and August; in September the numbers of flies declined rapidly and by the third week there had been a marked reduction which could not be related to the control activities. A thorough survey was undertaken from the ground as well as by helicopter, which showed conclusively that so many blackflies could not have originated from the successfully treated areas of the Phase I zone.

30. The determination of the physiological age, and the infection and infective loads, of the invading flies suggest that they may have originated from the south and south-west of the Programme area, where special surveys confirmed the existence of profuse S. damnosum breeding. The meteorological studies carried out in the Programme area by a team from the Centre for Overseas Pest Research (UK) could assist in determining whether unusual meteorological conditions were at the origin of this exceptionally long-range flight of the vector.

31. Cytotaxonomical studies will also help in identifying these flies and a special operational research plan is being prepared for a full investigation of the situation in 1976, should a similar phenomenon recur, and to develop appropriate countermeasures.

32. During the period under consideration, the hydrobiological teams, contracted to monitor the possible impact of the insecticide applications on freshwater non-target organisms, did not detect any harmful side-effects from the treatments. For recording purposes, and also to plan and evaluate the control operations, all data originating from the entomological and hydrobiological surveillance networks are being recorded on forms, specially designed for this purpose, for subsequent computer storage and analysis.

33. In addition to carrying out the vector control operations and monitoring results, the Vector Control Unit has devoted a considerable proportion of its time and resources to preparation for the extension of control operations to the Phase II and III zones. For Phase II, geographical reconnaissance has been completed, the required infrastructures established, staff recruited and trained. The entomological surveillance network was operational in time to collect pre-spraying base-line data in the Phase II zone during the rainy season of 1975. The final geographical reconnaissance and aircraft crew training is scheduled for November and December 1975, and actual operations will begin in January 1976.

34. Epidemiological Evaluation and Public Health Unit: With the filling of a number of key posts in this Unit, the first mobile epidemiological evaluation team was formed, consisting of an ophthalmologist, parasitologist, a sociologist, operations officer and support staff. Following a period of training, the team began detailed and basic surveys in Upper Volta in February. Sociological studies are made of villages under survey.

<table>
<thead>
<tr>
<th>Flight hours</th>
<th>Fuel used (litres)</th>
<th>Insecticide applied (litres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Helicopters</td>
<td>2 074.5</td>
<td>191 538</td>
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<tr>
<td>Fixed wing aircraft</td>
<td>426.7</td>
<td>61 594</td>
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<tr>
<td>Total</td>
<td>2 501.2</td>
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35. After several weeks of operations, the methodology for the epidemiological evaluation was redefined in collaboration with staff members from WHO/HQ, and the forms used for the different types of evaluation were modified. In view of the necessity of re-examining at regular intervals the population of villages selected for longitudinal epidemiological study, a special form was devised for the population census.

36. With the exception of the second ophthalmologist, the remaining personnel in the Unit, including the Chief, assumed their duties during the second and third quarters of the year and the second evaluation team became operational in September.

37. So far simple and detailed surveys have been carried out in about 55 villages with a population of about 12 000, in Ivory Coast and Upper Volta, and plans for evaluation in Mali and Ghana have been developed; the plan for Ghana was discussed with the national authorities during September.

38. Cooperation from the national medical services and participation of the population has been generally very good.

39. In the field of public health, the inventory of health resources in the Programme area is being reviewed in collaboration with the national authorities and the WHO representatives in the countries concerned. This will be used to assist, when necessary, in the establishment of a health infrastructure.

40. At the request of the Government of Dahomey, a special study is being made concerning the development of health services in the Provinces of Bourgou and Atakora.

41. **Administrative Services Unit:** In addition to the general administrative support provided to the Programme in terms of installations, budget and finance, personnel and supplies, the Administrative Services devoted much time to the preparation of the infrastructure for the Phase II control operations. Additional support personnel were recruited and trained, supplies and vehicles were obtained and allocated as appropriate.

42. Arrangements were made for the construction of subsector offices at Bole and Yendi and garages at Bobo-Dioulasso and Korhogo Sectors. Work on the Tamale Sector/subsector offices began in September and bids for construction of the hangar were called for.

43. Steps were taken towards the construction of the Programme Headquarters: in preparation, existing structures on the site were modified or demolished; plans for the new building were approved; a contract concluded for supervision of the construction and a call for bids sent out. For budgetary reasons, however, this project has been postponed.

44. The Unit is responsible for the management and maintenance of the Programme vehicles, and workshops for vehicle repair and maintenance are being set up throughout the Programme area. Five of the six volunteers who assist the Programme are engaged in this work.

45. At present administrative matters related to 32 senior staff and 391 support staff are handled. Training courses for drivers and typists were initiated; English language classes are also being held for staff in Ouagadougou and Bobo-Dioulasso. Arrangements were made for staff members exposed to the dangers of parasitic diseases to undergo special periodical medical examinations.

46. During the period under consideration WHO internal auditors and staff from the WHO/HQ Division of Budget and Finance visited the Programme to review financial controls and procedures.

D. **WHO HEADQUARTERS SUPPORT UNIT**

47. In addition to handling all research activities (paras 54 to 69) and relations with the advisory and management bodies and other sponsoring agencies, the OCP Unit in WHO Headquarters has continued to provide backstopping to the Programme in connexion with the recruitment of personnel and consultants, procurement of supplies, including insecticide, and establishment of
the radiocommunications network. The Unit also handled negotiations concerning the subcontract for the aerial spraying operations. Members of the unit were detached to assist the Programme during the absence of field personnel on vacation.

48. In view of the urgent need, as stressed by the Scientific and Technical Advisory Committee, to develop epidemiological and chemotherapeutical research, a medical officer (epidemiologist) was recruited to handle these activities and assumed his functions in April. Similarly, to meet the recommendation made by STAC at its first meeting regarding the storage and analysis of data, the support personnel was further strengthened by the addition of a statistician and a statistical clerk.

49. Recognizing the importance of the research activities to the Programme, it was decided to set up an OCP Research Coordinating Committee to review all proposals submitted to WHO and decide priorities for the allocation of funds. This Committee has met five times so far and considered about 30 propositions for research covering subjects ranging from aquatic monitoring to the study of antigenic extracts from Onchocerca volvulus.

50. Visits were made by support personnel to research institutions and workers in the United States of America, Canada, the Federal Republic of Germany and Belgium, to discuss ongoing research of direct interest to OCP and to consider possible collaboration. Visits were also made to institutions in Ghana and Ivory Coast to review the research already being conducted under agreements with WHO.

51. Following the aircraft accidents early in the year, discussions took place with representatives from Evergreen Helicopters Inc. to review the possible reasons for the accidents and to agree measures which might be taken to safeguard against future incidents and ensure the continuity of spraying. As a result of this, a standby helicopter was positioned in the Programme area. Further discussions took place in August to negotiate the price for the additional helicopters required by the Programme.

52. In addition to preparation of the thirteenth and fourteenth sessions of the Steering Committee and the second meeting of the Scientific and Technical Advisory Committee meeting, the Unit organized working groups of Scientific Advisory Panel members to review insecticide evaluation and aquatic monitoring protocols, and took steps to arrange a further working group on the development of self-perpetuating colonies of S. damnosum. Members of the Unit also participated in the inter-agency meeting on economic development, the third meeting of the Ecological Panel and an Information Day on Onchocerciasis organized by the Government of Belgium.

53. Preparation of the quarterly progress reports for distribution to members of the Joint Coordinating Committee, National Onchocerciasis Committees, the advisory bodies and the sponsoring agencies is also undertaken by OCP Geneva.

E. APPLIED RESEARCH AND TRAINING

54. The research element of the Programme was strengthened during the year and embraced a variety of studies on the ecology and biology of Simulium damnosum, on new and established insecticides, and on the effects of insecticides on target and non-target organisms. These studies are being conducted under research agreements negotiated by WHO with the institutions concerned.

55. The Center for Disease Control, Atlanta, GA, United States of America, and the Institute of Tropical Medicine, Tübingen, Federal Republic of Germany, worked on the development of self-perpetuating laboratory colonies of S. damnosum. Research on the S. damnosum complex was conducted by the Organization for Coordination and Cooperation in the Control of Major Endemic Disease (OCCGE) at its Onchocerciasis Entomological Centre at Bouaké, Ivory Coast, and a cytotoxinologist was included among the staff of the Programme. Other - particularly biochemical - methods for identifying cytotypes were studied at Legon University, Ghana, in association with the Liverpool School of Tropical Medicine, United Kingdom. Systems for sampling adult and larval populations were under development by the Office de la Recherche Scientifique et Technique Outre-Mer (ORSTOM) in conjunction with the Bouaké Onchocerciasis Entomological
Centre and the Prince Leopold Institute of Tropical Medicine, Antwerp, Belgium, while the Centre for Overseas Pest Research, London, has been investigating the effect of meteorological factors on the dispersal of *S. damnosum*.

56. Among the organizations or institutes collaborating on insecticide and associated environmental studies were the Onchocerciasis Entomological Centre and the Hydrobiological Section of ORSTOM, both at Bouaké, the Institute of Aquatic Biology at Accra, Alberta University in Canada, the Center for Disease Control at Atlanta, Reading and Salford Universities in the United Kingdom, and the Institute of Medical Research at Zagreb, Yugoslavia. In order to suit insecticide formulations to the vector, the size of particles ingested by *S. damnosum* larvae was under investigation. Research on the physico-chemical properties of emulsion concentrate larvicides was focused not only upon Abate - the compound at present in operational use - but also upon possible alternatives. This included studies of the effects of various compounds on larval detachment and reattachment and attempts to improve the present methods for testing the susceptibility of the larvae to insecticides. New and strict protocols for insecticide trials and for aquatic monitoring were drawn up with the assistance of members of the Scientific Advisory Panel, and the evaluation of insecticide formulations are made on both target and non-target organisms. Several new larvicides and a micro-encapsulated formulation of chlorpyrifosmethyl - already shown to be effective as an emulsifiable concentrate - are being evaluated under field conditions in West Africa. A larvicidal formulation of chlorphoxin, also known to be effective, will be applied weekly (as in operational use) to a *Simulium*-infested river in Ivory Coast to evaluate its possible long term side-effects on non-target species. New chemical methods of monitoring of Abate in the environment were developed, and similar methods are being devised for other larvicides under trial. The methods developed include special field sampling and extraction techniques, and accurate determination of residues by gas-liquid chromatography. For Abate it is possible to measure quantities as low as 2 ng in mud, water and fish samples. The effect of metrifonate upon the mammalian organism that has been exposed to Abate is also being studied.

57. **Epidemiology and chemotherapy:** Under the UNDP-financed applied research programme, trials have been carried out with suramin and diethylcarbamazine (DEC) in villages in Upper Volta by the National Mobile Ophthalmological Unit, and research into the feasibility of mass treatment of onchocerciasis with DEC over a long period was conducted by the Royal Commonwealth Society for the Blind team in Northern Ghana. The RCSB team also carried out detailed epidemiological studies in a number of villages in Northern Ghana.

58. A complete search of medical, pharmaceutical, biochemical and biological literature on suramin and DEC has been initiated in WHO Headquarters.

59. Collaboration with the Centre for Disease Control, Atlanta and OCP has been established for the standardization of a specific indirect fluorescent antibody test.

60. **Training:** Under the agreement concluded with OCCGE for the training in entomology at the Centre Entomologique de l’Onchocercose at Bouaké, 1 assistant entomologist and 8 technicians (5 Ghanaians and 4 Voltaics) attended courses. Two candidates from Togo began basic entomological training in September, and a candidate from Niger will commence training in October 1975.

61. The participating countries were advised of the availability of fellowships for studies in public health, and onchocerciasis epidemiology and chemotherapy. So far one fellowship has been awarded to a candidate from Mali to attend a public health course in France commencing October 1975. This course will be followed by studies on onchocerciasis.

62. **Conclusions**

The first year of actual control operations has been constructive and informative: from the experience gained, the Organization has been able to adjust the control strategy before extending activities into the Phase II zone.
Larviciding activities were highly successful throughout the Phase I zone, despite difficulties encountered initially at certain sites where intensive breeding occurs. With the means available, every effort was made to find the reason for, and the origins of, the high density of flies which were recorded from May to August in the southern part of the controlled area and an operational research programme is planned to investigate in detail this phenomenon should its recurrence in 1976 be of a similar type and magnitude.

The logistic and administrative support provided to the Programme is being evaluated in the light of experience gained to achieve the best possible utilization of manpower and resources.
ONCHOCERCIASIS FUND

Financial situation as at 30 September 1975
(expressed in US dollars)

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<td>4 430 465</td>
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<td>1 334 311</td>
<td>1 376 646</td>
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