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AN OVERVIEW
OF
THE ONCHOCERCIASIS CONTROL PROGRAMME IN WEST AFRICA
(OCP)

This information document will be updated as
and when Programme developments so warrant.

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A. ONCHOCERCIASIS: THE DISEASE, ITS TRANSMISSION AND CONTROL

1. The disease and its importance

1.1 Onchocerciasis ("river blindness") is caused by a parasitic, filarial (threadlike) worm, Onchocerca volvulus, of which the adult female (macrofilaria), 40-45 cm long, lodges in nodules under the human skin or deeper in the tissues where during a lifespan of 11 to 12 years it produces millions of microscopic embryos (microfilariae) which live for about two years. The microfilariae give rise to intensely itching rashes, to wrinkling, thickening and depigmentation of the skin, to lymphadenitis resulting in hanging groins and elephantiasis of the genitals and, eventually, to severe eye lesions, including blindness, as well as to loss of weight and general debilitation.

1.2 The disease is found along rivers in tropical zones in Africa, the Middle East (Yemen) and Latin America. It is estimated (1986) that globally 85.5 million people are exposed to the risk of onchocerciasis, about 17.7 million are infected and 340 000 are blind as a result of onchocerciasis.

1.3 Although onchocerciasis does not cause death, the effect on the community is devastating. Fertile land is forsaken and villages near rivers are abandoned in fear of contracting the disease and as the burden of supporting the blind becomes too heavy for those still with sight.

2. The vector and the transmission

2.1 The vectors in West Africa are blackflies of the Simulium damnosum species complex. The females of the blackfly lay their eggs (around 300 per batch) at, or below, water surface in fast-flowing rivers. They hatch after 36 to 48 hours and the larval stage lasts five to ten days followed by pupation. Adults emerge after a further two to four days. The females mate once in their life, immediately after emergence from the river. The lifespan of a blackfly is thought to average three to four weeks during which time it can cover several hundred kilometres in flight.

2.2 The female blackfly takes up microfilariae (up to 400) when biting infected persons and transmits the infective L3 larvae (only 3 or 4 survive) to other persons during subsequent bloodmeals (necessary for the maturation of its eggs to be laid three to four days later). The larvae develop in the human host into adult male and female worms (macrofilariae) thus completing the life cycle of the parasite (for graphic presentation, see Annex 1). The clinical incubation period (time between larval infection and development of symptoms) is in the order of one to three years.

3. The control

3.1 The role of chemotherapy in the control of onchocerciasis¹ has until the late 80s been rather limited (for the role of ivermectin 6 mg (Mectizan^R Merck): see section 15 below). Diethylcarbamazine (DEC) is a microfilaricide (kills microfilariae) and must therefore be given repeatedly as long as the patient harbours fertile female worms. DEC provokes severe and sometimes dangerous systemic (Mazzotti) reactions and can aggravate existing, or precipitate

¹ The removal of onchocercal nodules to control the disease is practiced in Latin America but not in Africa.

new, ocular lesions. Suramin, a macrofilaricide (kills the adult worm) required to be given once weekly up to two months, is of restricted use insofar as it can give rise to serious adverse reactions such as anaphylactic shock and kidney, liver and gastrointestinal complications. None of these two drugs can therefore be applied on a large scale. Their use is limited to the treatment of individual cases under strict medical supervision.

3.2 Consequently, all attempts at controlling the transmission have been through suppressing the vector by the treatment of the blackfly larvae in their breeding sites with insecticides. Although a few control programmes in small, isolated foci had seen some success, the majority of such efforts failed until the Onchocerciasis Control Programme in West Africa (OCP) introduced larviciding on a large scale by helicopter and fixed-wing aircraft.

B. THE ONCHOCERCIASIS CONTROL PROGRAMME: BACKGROUND, ORGANIZATION, OPERATIONS AND COSTS

4. How did the Programme come about?

4.1 During the sixties onchocerciasis in West Africa became increasingly recognized not only as a major public health problem but also as a serious obstacle to socioeconomic development. In 1968 a Joint USAID¹/OCCGE²/WHO Technical Meeting on the Feasibility of Onchocerciasis Control held in Tunis, Tunisia, concluded that "a large-scale Simulium control scheme for the purpose of reducing the prevalence and intensity of onchocerciasis among the people living in the savanna zone of West Africa" was feasible.

4.2 The findings of the Tunis meeting induced seven West African countries³ to request intergovernmental and bilateral agencies (including UNDP, FAO, WHO, IBRD, EDF⁴ and USAID) to provide support for the preparation of a strategy for an Onchocerciasis Control Programme in the Volta River Basin area (changed in 1986 to the Onchocerciasis Control Programme in West Africa (OCP)). Subsequently, a UNDP-funded Preparatory Assistance Mission to the Governments of the (seven) Participating Countries (the PAG Mission) submitted a proposal in October 1973 to a meeting of the Participating Countries who gave their approval to the 20-year Programme while the Donors in early 1974 committed funds for the initial phase of OCP operations. WHO was appointed the Executing Agency.

5. Who benefits from OCP operations and what are the operational characteristics of the Programme area?

5.1 The boundaries of the Programme area drawn by the PAG Mission were determined by the occurrence of the blinding ("savanna") form of onchocerciasis and excluded areas where the less severe ("forest") form prevailed. The initial area covered 654 000 km² in Benin, Burkina Faso, Côte d'Ivoire, Ghana, Mali, Niger and Togo (start of vector control:

¹ Agency for International Development of the United States of America

² Organisation de Coordination et de Coopération pour la lutte contre les Grandes Endémies

³ Benin (then Dahomey), Burkina Faso (then Upper Volta), Côte d'Ivoire, Ghana, Mali, Niger and Togo

⁴ European Development Fund

geographical Phase I in February 1975, Phase II in January 1976, and Phase III (East and West) in March 1977 - see map in Annex 2a).

5.2 An extension of the area (110 000 km²) into the south of Côte d'Ivoire (Phase IV) took place in 1978/79 thus bringing the Original Programme area to 764 000 km² with an estimated population of more than 10 million protected by Programme operations. At least one million of those were infected by onchocerciasis including 100 000 cases of severe eye lesions of which more than 35 000 were blinded by the disease. In all, 18 000 km of river were under vector control (entomological surveillance and larviciding (see paragraph 9.1 below)).

5.3 With the decision in 1985 to expand OCP operations to the Southern and Western Extension areas (adding to the list of Participating Countries: Guinea, Guinea-Bissau, Senegal and Sierra Leone - see paragraph 12.1 below) the total area increased to 1 235 000 km², the population protected by OCP control to 30 million, and the length of rivers under vector control to 50 000 km (see map in Annex 2b). It is estimated that 2.4 million people in the two Extension areas harbour O. volvulus and that close to 100 000 are blind due to onchocercal infection.

6. How is the Programme structured and managed?

6.1 The overall authority for policy-making, planning, programming, implementation and financing of OCP operations is vested in the Joint Programme Committee (JPC) composed of representatives of the Participating Countries, of the Donors and of the Sponsoring Agencies (UNDP, WHO, FAO and the World Bank. JPC normally meets once a year to consider the annual progress report, to approve next year's Plan of Action and Budget, to pledge contributions for the coming year, and to deal with other important Programme matters.

6.2 The Expert Advisory Committee (EAC) with a membership of not more than 12 scientists carries out annual, independent evaluations of OCP operations and gives technical and scientific advice to JPC, through CSA (see following paragraph), and to the Programme Director. The five-member Ecological Group, a sub-committee of EAC, monitors the effect of vector control on the aquatic environment.

6.3 Representatives of UNDP, WHO, FAO and the World Bank meet several times a year as the Committee of Sponsoring Agencies (CSA) to monitor Programme operations, consider management issues and review documentation for JPC. CSA can provisionally authorize supplementary budgets and approve transfer between budget lines. The Committee also supports socioeconomic development of the oncho-controlled zones.

6.4 National Onchocerciasis Committees (NOCs) in the Participating Countries promote OCP sponsored activities, such as devolution. Representatives meet as required. (Annex 3 summarizes the Programme structure).

6.5 The Programme is managed according to WHO procedures and is technically and administratively assisted by that organization.

6.6 The Director of OCP is supported at Programme headquarters in Ouagadougou, Burkina Faso, by five technical and administrative units (vector control, epidemiological evaluation, biostatistical analysis and information systems support, support to devolution, and administration and support services) each headed by a chief assisted by operational/scientific and General Services staff (organigramme in Annex 4). A Liaison Office is situated at WHO/HQ in Geneva.

7. How is the Programme funded and what has been its cost so far?

7.1 The Programme is financed by donor agencies, international development banks, multilateral institutions and organizations belonging to the United Nations system (Annex 5 lists the Donors). In addition, the Participating Countries contribute in cash and/or in kind, making available office space and other facilities to the Programme as well as nationally remunerated staff.

7.2 All Donor contributions are paid into the Onchocerciasis Fund administered by the World Bank which solicits contributions from individual Donors. A Plan of Action and Budget is presented for approval to the Joint Programme Committee at its annual session at which funds for the subsequent year are pledged. The internal and external audit of OCP expenditures is similar to that of WHO and the Onchocerciasis Fund is audited by the World Bank's external auditors.

7.3 To allow for medium-term planning and budget-forecasting, a system of six-year "Financial Phases" has been instituted, each "Phase" being covered by an Onchocerciasis Fund Agreement signed by the "Contributing Parties" which constitutes the legal basis for the funding and operations of the Programme. A Memorandum of Agreement, describing the institutional and operational arrangements of OCP, is signed by each of the Participating Countries and forms part of the Onchocerciasis Fund Agreement. An individual protocol with each Government is also established with OCP, detailing the respective inputs, support and responsibilities with regard to staff, buildings, communications, services, etc.

7.4 The costs of operating the Programme and the proportional share of the various activities are presented in Annex 6.

8. What is the objective of the Programme ?

8.1 The Expert Advisory Committee recommended at its June 1990 session to the Joint Programme Committee that the objective be modified to read: "to eliminate onchocerciasis as a disease of public health importance and as an obstacle to socioeconomic development throughout the Programme area, and for the Participating Countries to maintain this achievement." JPC approved this redefinition.

9. How does the Programme function ?

9.1 Vector Control: aims at virtual interruption of transmission wherever there exists a human reservoir of onchocercal parasites with a potential for causing the blinding form of disease. The operational approach consists of aerial spraying designed to kill the blackfly in its larval stage at breeding sites in fast flowing rivers, and of maintaining larviciding until the human reservoir of the female worm dies out i.e. after 14 years of control operations (see paragraph 18.2 below). The periodicity (weekly or less frequent) and dosage of larviciding are determined by the findings of the entomological surveillance network and by hydrological readings. The network totals three sectors and six sub-sectors in the Original Programme area, as well as three sectors and 13 operational bases in the Western Extension areas, all operated by nationally employed teams directed and supported financially and logistically by OCP. Each sector headquarters has a complement of 15-25 posts comprising entomologists, laboratory assistants, vector collectors, radio operators, clerks, drivers/mechanics and guards, while a sub-sector is manned by 10-20 staff.

9.2 The sectors and sub-sectors are responsible, at different levels of competence, for checking the absence, or determining, the presence of blackfly larvae in rivers under treatment (effect of larviciding), for catching blackflies for identification and dissection to ascertain their infectivity according to the presence or absence of *Onchocerca volvulus* in larval stages, and for reading water gauges - all in order to provide the data necessary for conducting aerial operations and evaluating their impact. Two indices are used for this purpose: the Annual Biting Rate (ABR)¹ and the Annual Transmission Potential (ATP)². The Programme is increasingly making use of automatic devices in the rivers linked to satellite radio transmitters for the continuous recording of water levels and discharge rates.

9.3 The Programme has at its disposal (on a commercial contract) up to 11 helicopters, depending on the season. The number of flying hours oscillates around 10 000 per annum with an annual larvicide consumption of 4 500 000 litres.

9.4 The OCP area has, for operational purposes, been divided into an Eastern Operational Zone (geographical Phases II and III East plus the Southern Extension area) with headquarters in Kara, Togo, and a Western Operational Zone (Phases I, III West and IV plus the Western Extension area) with overall operational headquarters in Bamako, Mali. The aircraft fleet is based at Odienné (Côte d'Ivoire) and in Kara (Togo). A larvicide testing station is located in Bouaké, Côte d'Ivoire, where the DNA probe laboratory is also situated.

9.5 Surveillance of the aquatic environment to ensure the absence of ecologically damaging effects of larvicides is assured by the Vector Control Unit with a team monitoring the invertebrates and by national hydrobiologists studying the fish population. The Ecological Group meets once a year to review the environmental effect of vector control, or its absence, and to make recommendations for future activities in this field.

9.6 Epidemiological Evaluation: Data pertaining to the incidence, prevalence and community load of infection as regards onchocerciasis are obtained by repeated simple evaluations involving microscopy of skin snips for the detection of microfilariae and clinical/visual testing, and detailed evaluation which also includes ophthalmological tests of populations in preselected indicator villages. Furthermore, onchocercal nodules are excised to determine the longevity of the female worm and to study the immunological properties of the parasite. Around 50 villages averaging 300 inhabitants are visited each year, of which 10-20% undergo detailed examination.

9.7 More recently, due to the scare of transmission of such viral diseases as hepatitis and AIDS through mass application of diagnostics methods involving cutaneous perforation, OCP is reducing skin-snipping to an absolute minimum and, whenever its use is indispensable, adhering strictly to WHO instructions designed to prevent such transmission.

9.8 Epidemiological evaluation has so far been oriented essentially towards assessing the effect of larviciding, but is now increasingly used to determine when the prevalence has reached the level at which vector control can be safely withdrawn. Larviciding is discontinued after 14 years

¹ The number of blackfly bites a person would receive if he or she were to sit at the river bank for eleven hours a day, 365 days a year. The level of tolerability has been set at an ABR of 1000.

² The number of infective larvae which might have been transmitted to the person under¹ above by the biting flies. The level of tolerability has been set at an ATP of 100.

if the decline in the Community Microfilarial Load¹ and in the prevalence of skin microfilariae in indicator villages accords with model predictions (see paragraph 9.11 below). Furthermore, there should have been no significant incidence of infection (including no incidence in children born since the start of vector control) during the control period and the results of cross-sectional surveys in surrounding villages should be consistent with those for the indicator villages.

9.9 The Epidemiological Evaluation Unit (EPI) has also undertaken epidemiological mapping to describe the distribution and severity of onchocerciasis within the OCP area, to select foci for large-scale ivermectin treatment (see section 15 below), and to establish baselines for evaluating the impact of vector control and ivermectin treatment. The major part of this work is carried out by national teams supported and supervised by EPI.

9.10 Devolution (or maintenance of OCP achievements): Consists of active epidemiological surveillance of the disease, once larviciding comes to an end, and control of recrudescence by ivermectin where required. Devolution is the responsibility of the Participating Countries which are assisted by the Donors and the Sponsoring Agencies in the preparation and implementation of the process. The OCP Devolution Unit, established in 1991, supported by the WHO/AFRO Intercountry Devolution Coordinator, assists countries in drawing up operational programmes, in raising of awareness and communication, in operational research and in the mobilization of resources. The Unit also administers the OCP training programme.

9.11 Biostatistics and Information Systems: This unit provides support to other technical units as regards the analysis of operational data and the planning and evaluation of field studies. An integrated computerized model for onchocerciasis transmission and control has been developed and computer programmes for aerial operations and for certain management activities are under implementation. The computer network covers OCP headquarters and all OCP operational bases.

9.12 An important use of the epidemiological model is its contribution to the final decision regarding cessation of larviciding in areas where vector control has been underway for a period which in principle should suffice to eliminate the human reservoir of the parasite.

9.13 In connection with preparations for devolution, the epidemiological model will help to clarify such issues as the maximum admissible time between the return of infection and its control, the epidemiological interpretation of surveillance data based on skin snips or immunodiagnosis (when available), and the operational aspects of recrudescence control by ivermectin (threshold values, population coverage, frequency and duration of treatment, etc.).

9.14 Training: The OCP training programme caters for fellows from Participating Countries. The selection of candidates is made in accordance with the immediate or future operational needs of the Programme with emphasis on the requirements for integrated national onchocerciasis maintenance activities to follow the cessation of OCP operations (devolution). Practically all fellowships are granted for studies inside Africa. OCP also runs training courses for its own staff.

9.15 Research: Priority, guided by recommendations of the Expert Advisory Committee, is given to such subjects as the development of larvicides, the mechanism of resistance, taxonomy of vector species, their distribution and vectoral role, identification of parasite strains, diagnostic methods, the determination of the epidemiologically insignificant level of the disease, modelling,

¹ CMFL: the geometric mean of microfilariae per skin snip among persons aged 20 years and more

and operational studies designed to ensure a continuing improvement in the cost-efficiency of Programme operations. The Onchocerciasis Chemotherapy Project (OCT), now funded jointly by OCP and the Special Programme for Research and Training in Tropical Diseases (WHO/UNDP/World Bank) - the Macrofil Project -, and the pharmaceutical industry, have since 1982 been engaged in the search for anti-onchocercal drugs with the focus on a macrofilaricide.

9.16 Management (Office of the Director and Administration and Support Services): The Director's Office deals with matters of Programme policy, management and coordination; liaison with governments, the Donor community, OCP statutory bodies, and the scientific community; and information. The chief of Administration and Support Services is responsible for budget and finance, personnel, supplies and equipment, transport and buildings. The management of Programme operations, including the direction of aerial operations, is facilitated by a comprehensive radio network connecting all sectors and sub-sectors with the operational bases and with the OCP Headquarters. The car fleet consists of 308 vehicles.

9.17 Socioeconomic Development: Activities in this field, as regards OCP, have been entrusted to the Committee of Sponsoring Agencies (CSA) which has sponsored a regional study to identify within areas under OCP control, the zones with promising developmental potential followed by an analysis of land settlement activities in the Participating Countries. A Ministerial Meeting on Policy Issues for Sustainable Land Settlement within the OCP Area is being prepared for 1994 and CSA is launching a Pilot Project on Environmental Impact Assessment in the OCP Area.

9.18 The staff complement of the various units is set out in Annex 7.

C. DECISIVE OPERATIONAL EVENTS AND PROGRAMME PLANNING

10. Reinvasion

10.1 Since 1976 limited zones in the western and south-eastern parts of the Original OCP area have been exposed to annual reinvasion of infective savanna blackflies coming from sources then located outside the Programme boundaries, particularly in Guinea, Togo and Benin. Also, some reinvasion originated from sources in the south of Côte d'Ivoire and larviciding operations were extended southward as from 1978/79. More recently, reinvasion into the upper Niger Basin and beyond into southern Mali, has been demonstrated as originating from northern Sierra Leone. It was soon realized that without controlling the sources of reinvasion there would be little or no improvement in the epidemiological situation in the peripheral reinvaded zones and this became a forceful argument in favour of expanding operations to the Extension areas in addition to that of providing the populations living there with protection from the disease (see paragraph 12.1).

11. Resistance

11.1 Resistance to temephos among the forest species of the blackfly, Simulium damnosum was encountered at an early date in those areas in the south of Côte d'Ivoire where both species prevailed. Nonetheless, apart from an easily controlled, circumscribed instance of resistance in the far South in 1983, the savanna species maintained full susceptibility to the universally applied, highly effective, low-cost larvicide, temephos until 1985. However, there has since 1986 been a rapid spread of lowered susceptibility to organophosphorous compounds (temephos) throughout

the Programme area, a resistance successfully overcome by the rotational use of larvicides belonging to different groups.

12. Long-Term and medium-term planning and programming

12.1 The Joint Programme Committee approved a Long-Term Strategy in December 1984 which was further detailed in a Plan of Operations for the third Financial Phase (1986-1991) adopted by JPC in December 1985. The principal elements of the two documents were as follows: expansion of Programme operations into the Western and Southern Extension areas adding Guinea, Guinea-Bissau, Senegal and Sierra Leone to the list of Participating Countries (see map in Annex 2b); the use of nationally employed personnel receiving premiums for added responsibility and per diem by the Programme in the Western Extension area (OCP-employed entomological surveillance staff being already in place in the Southern Extension area since 1979); the concept of devolution narrowed down to the Participating Countries' health care systems being capable of detecting and controlling recrudescence of the disease; and the possibility that OCP supported research might introduce chemotherapy as a supplementary means of control.

12.2 The Plan of Operations for the fourth Financial Phase (1992-1997), approved by JPC in December 1991, reflects the operational policy laid down in the Long-Term Strategy. The budgetary forecast is in the order of US \$ 175 million for the entire period.

D. ACHIEVEMENTS OF THE PROGRAMME

13. Entomologically

13.1 Since the start of vector control, the target savanna species of the blackfly, Simulium damnosum sensu strictu and Simulium sirbanum, have in most of the Original Programme area been maintained at a density so low that transmission has been virtually interrupted. In the remaining, essentially the reinvaded, zones the Annual Biting Rates and Annual Transmission Potentials (see paragraph 9.2 above) have until recently been unacceptably high but the progressive larviciding of sources of reinvasion in the Extension areas (since 1989 in the Western and since 1987 in the Southern Extension area) is now protecting the reinvaded zones.

13.2 The suppression of the vector populations is intended to last fourteen years, the time needed for the human reservoir of the parasite (Onchocerca volvulus) to die out. After that the blackfly will be allowed to re-enter the area in question. This situation has already been reached in most of the Original OCP area where larviciding has come to an end. Furthermore, the findings of the independent Ecological Group have confirmed that this long-lasting larviciding has been carried out with no damaging effect on the aquatic environment.

14. Epidemiologically

14.1 Expressed in epidemiological terms, the Community Microfilarial Load (CMFL)¹ the overall prevalence of the disease and the CMFL in the anterior chamber of the eye (CMFL/AC) (an important risk factor for the development of ocular lesions) have been reduced to practically nil in most of the Original Programme area.

¹ See footnote to paragraph 9.8

14.2 Furthermore, 30 million people are protected against infection and it is estimated that approximately nine million children born within the Original OCP area since the inception of Programme operations have been spared the risk of onchocercal blindness, that close to 1.25 million people have lost their onchocercal infection and that 100 000 people have been prevented from going blind. Once the Programme comes to an end by the turn of the century, the corresponding figures will have increased to 15 million, 2 million and 150 000 respectively.

15. In ivermectin distribution

15.1 Ivermectin is taken orally and rapidly brings the microfilarial load to a very low level lasting up to a few months before rising steeply to approach the pre-treatment level within a year. The clinical effects include immediate alleviation of discomforts such as itching, and a significant reduction in the risk of developing eye lesions. Preliminary results of the first studies indicated that ivermectin treatment had a considerable effect on transmission when distributed to a sufficiently large proportion of the target population but later investigations concluded that the impact of community-wide application of the drug was insufficient to be of value in sustained control of transmission.

15.2 Since large-scale field trials commenced in 1987, OCP organizes a programme of community-wide distribution of ivermectin in communities at risk of onchocercal blindness essentially in the Extension areas as a supplement to vector control. This activity is carried out with a strong national participation. By end-1992, more than 800 000 persons have started annual treatment schedule which will be continued for several years to come. This includes populations in the northern half of the Western Extension area where the entomological and epidemiological situation justifies ivermectin treatment as the sole means of control.

15.3 In the meantime, OCP is continuing its studies on the effect of ivermectin, including that on transmission, the periodicity of its application, its side-effects, the organization of its distribution on a large-scale, and its potential role in the control of recrudescence.

15.4 The drug is supplied free of charge by the manufacturer. OCP acts on behalf of the eleven Participating Countries as the procurement agency.

16. In devolution

16.1 Devolution plans for the seven countries in the Original Programme area have so far been approved by the Joint Programme Committee, while plans for the Western Extension countries have been finalized or are under preparation. All devolution plans foresee onchocerciasis surveillance and control being combined with that of other endemic diseases within the context of strengthened public health systems. Such devolution programmes are already operational in Benin, Burkina Faso, Mali and Niger.

17. In modelling

17.1 The construction of a transmission model and its application to OCP operations have been of crucial importance for such issues as the determination of the length of the reproductive life of the female worm, the effect of large-scale ivermectin distribution, the control of recrudescence and the strategy of future OCP operations including decision on withdrawal of larviciding from areas exposed to control during 14 years or more.

18. In research

18.1 The search for new larvicides has been successful. In addition to the two organophosphorous compounds, temephos and chlorphoxim, three larvicides are now available to OCP for rotational use in temephos/chlorphoxim resistant areas. These are B.t. H-14 which is low-cost, target specific and unlikely to develop resistance in the vector; permethrin, a pyrethroid, used for limited duration of continuous application; carbosulfan which is rather expensive and whose use is restricted to periods of high water flow; and pyraclofos, an organophosphate and replacement for chlorphoxim which has been withdrawn from production.

18.2 Considerable progress has also been made in such fields as identification and behaviour of blackfly species, case diagnosis including sero- and immunological testing, DNA probing to distinguish the blinding form of the parasite from that giving rise to less severe manifestation, and the determination of the longevity of the parasite. Thus, examination of excised nodules, supported by the epidemiological model predictions, has shown the reproductive life of the female worm to be in the order of 11 to 12 years with another two to three years of potential infectivity before the last microfilariae die out, a finding of great operational significance to the Programme.

18.3 As regards the search for a macrofilaricide which would, in principle, be given in one series only, OCP and TDR acting jointly as the Macrofil project, are supporting clinical trials of one candidate with several back-up compounds further down the development pipeline.

18.4 Operational research concerned with such activities as aerial larviciding and entomological surveillance, as well as the organization of large-scale ivermectin distribution is a permanent feature of the Programme. The results have contributed to an enhanced cost-efficiency of operations as has the annual staff seminar instituted by the Programme Director.

19. In training

19.1 Between 1974 and 1992, 370 candidates essentially from the Participating Countries have been awarded OCP fellowships as follows: 177 in entomology, 32 in hydrobiology, 53 in epidemiology, 44 in parasitology, 35 in ophthalmology, 12 in health economics, 14 in management and 3 in informatics. To this should be added in-service training from which a large proportion of the OCP staff, of whom more than 97% are Africans, have benefitted.

20. In socioeconomic development

20.1 Sofar 15 million hectares of riverain tillable land, enough to feed 10 million people have been made available for resettlement. By the end of the 1990s it is expected that this figure will increase to 25 million hectares potentially sufficient to produce foodstuff for more than 17 million people.

E. AND THE FUTURE?

21. With five to six larvicides at its disposal and the capability to utilize them effectively to overcome future instances of resistance, the Programme can now implement vector control in the Extension areas in full confidence that aerial larviciding there will achieve the desired effect on the transmission of the disease.

22. At the same time, the emergence of ivermectin has brought a new dimension to the Programme. With community-wide application of the drug to infested foci on a long-term basis, the clinical effect and ocular manifestations of the disease will rapidly become a saga of yesterday, while vector control eliminates the human reservoir of the parasite within the OCP area.

23. By 1994 OCP vector control will have withdrawn entirely from the Original Programme while larviciding in the Southern and Western Extension areas will continue at a gradually diminishing scale (see maps in Annex 8 and distribution of costs of operations (1991-1997) in Annex 9).

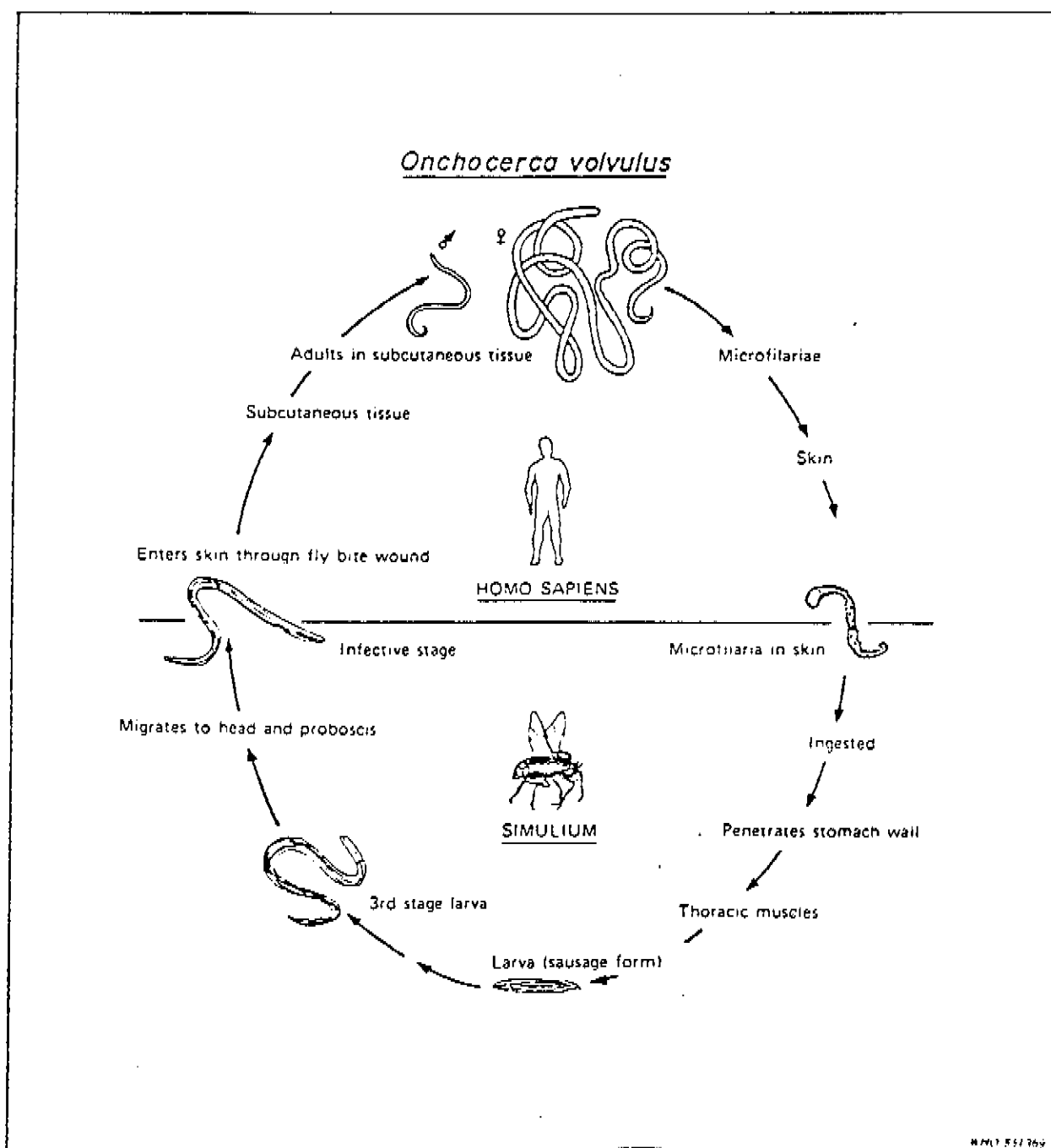
24. Finally, the Programme will intensify its efforts in the field of devolution, work out guidelines and support the Participating Countries in preparing for the eventual assumption of the surveillance of onchocerciasis and the control of possible instances of its recrudescence by means of ivermectin treatment and containment. This will be done in close collaboration with the WHO Regional Office for Africa.

F. PHASING-OUT THE PROGRAMME

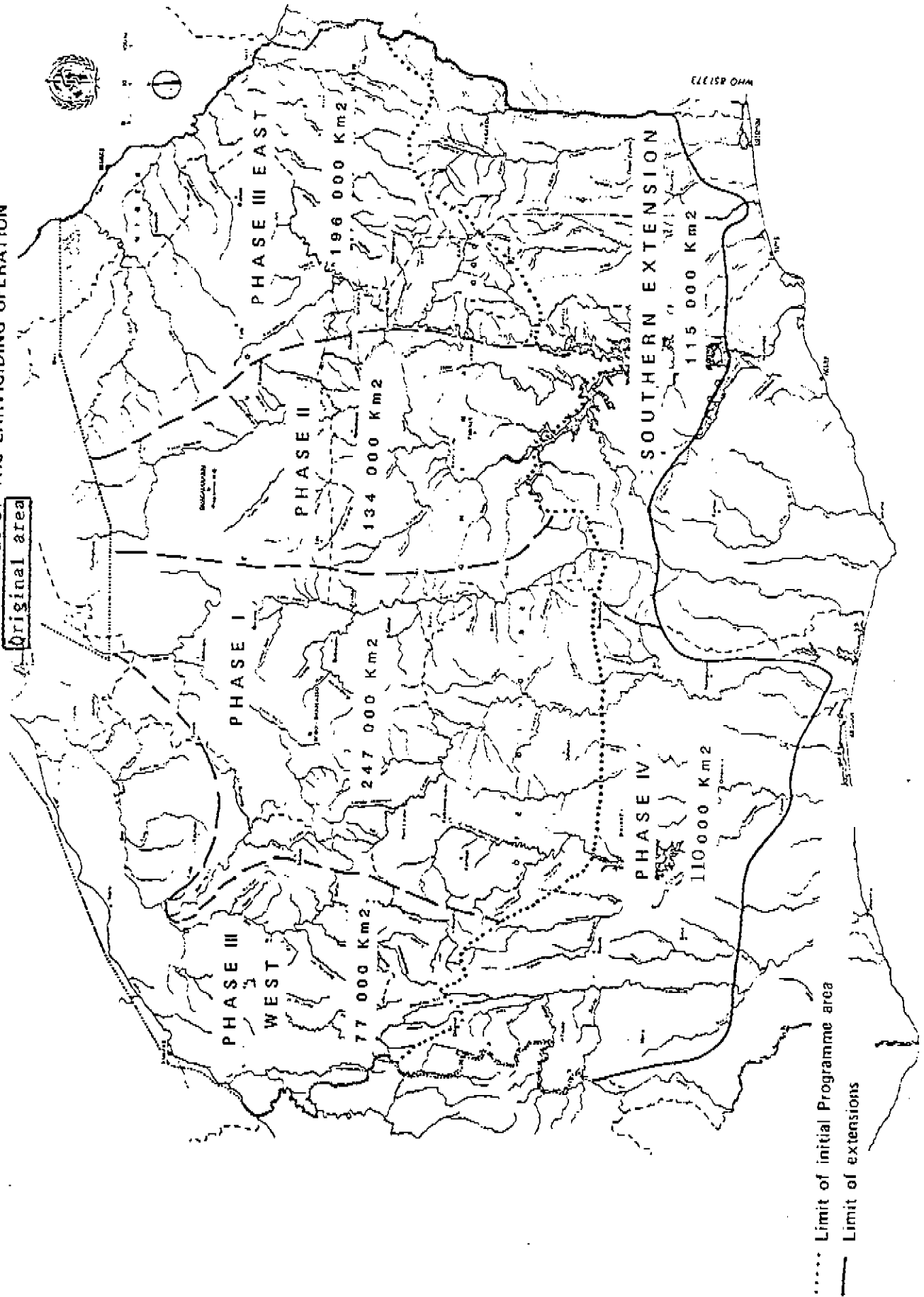
25. During the phasing-out period (beginning 1988 at the end of the fourth Financial Phase (1992-1997)), vector control will be rapidly discontinued and it is expected that OCP operations will cease by the end of the current decade with significant annual budget decreases.

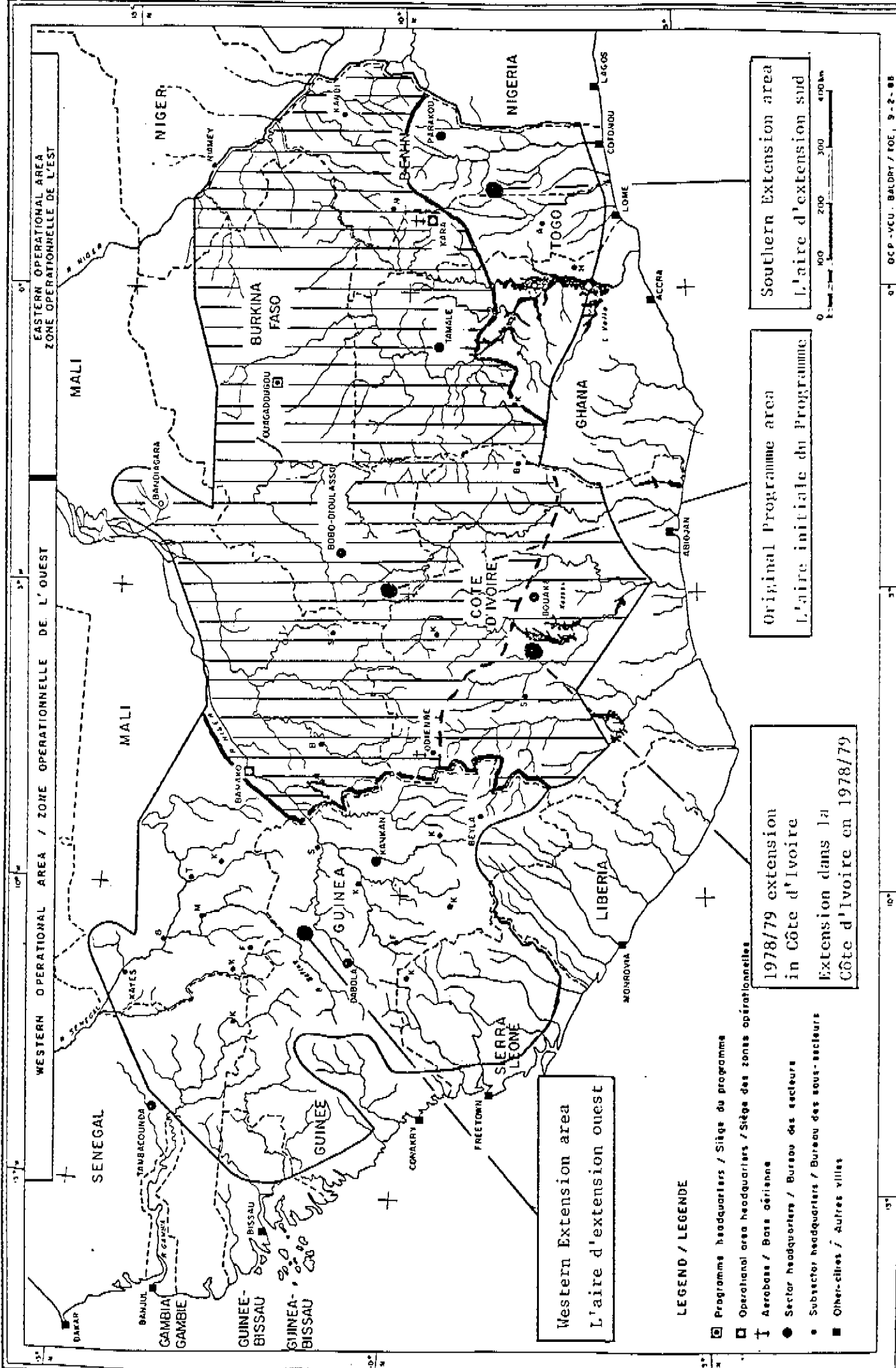
26. The search for a macrofilaricide applicable on a large scale under field conditions will continue unabated during the fourth Financial Phase and even into the phasing-out period, if necessary. Should such a macrofilaricide become available before the cessation of Programme operations, the operational forecasts would need to be reconsidered and the implementation of a revised strategy, including the use of a macrofilaricide, would probably lower the costs even more.

LIFE CYCLE OF ONCHOCERCA VOLVULUS

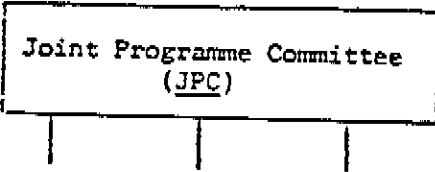
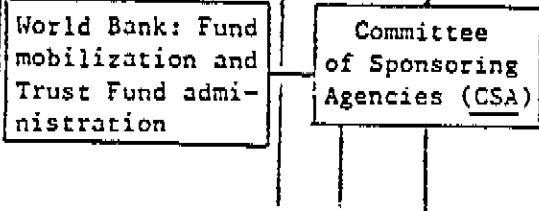
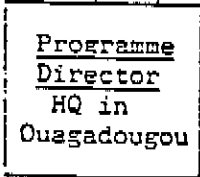
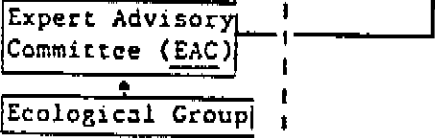
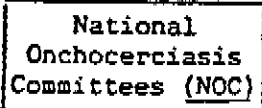


BOUNDARY OF THE PROGRAMME AREA AND PHASES OF THE LARVICIDING OPERATION

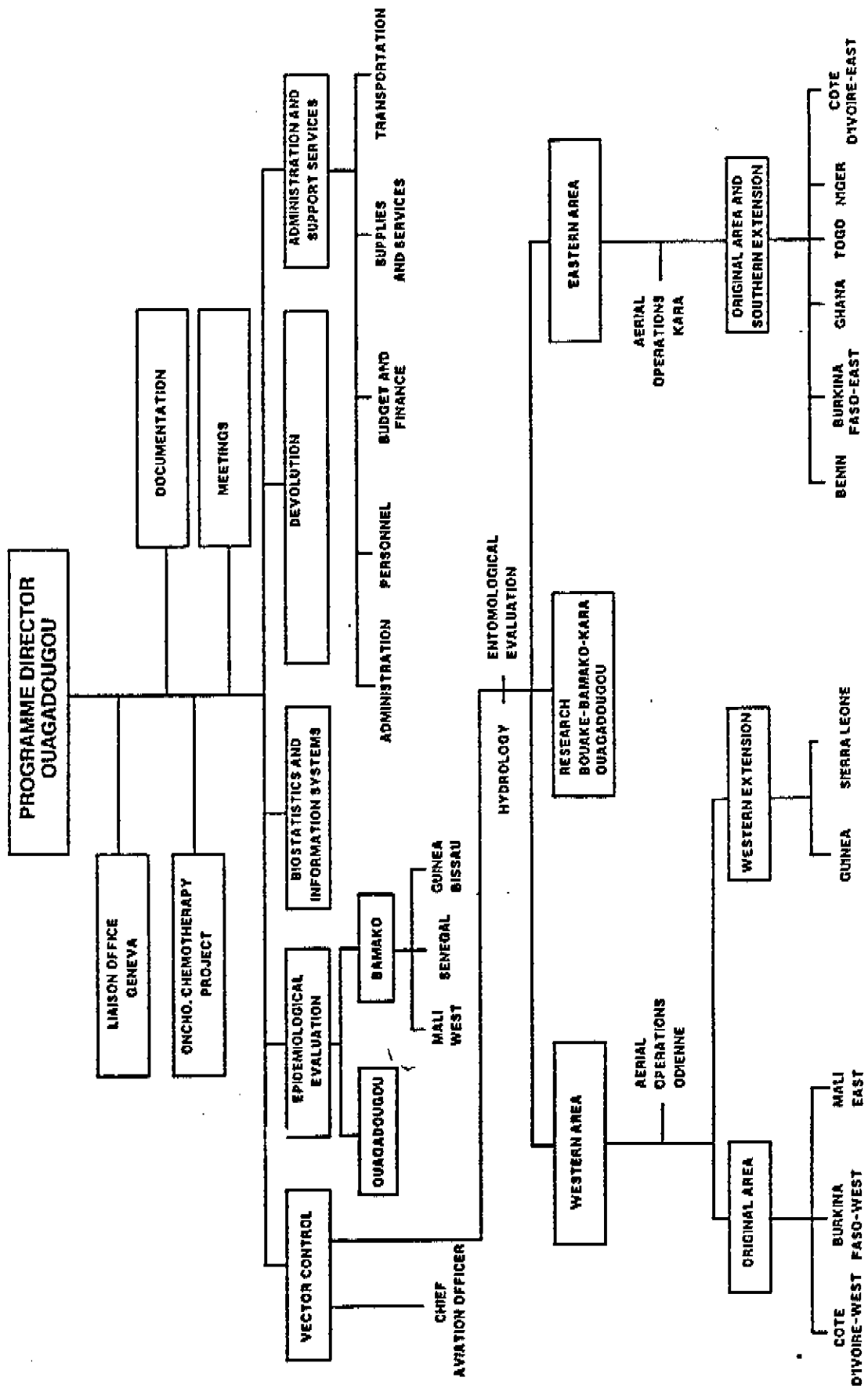




THE STRUCTURE OF OCP

Structure	Composition/support	Role/responsibility
 <p>Joint Programme Committee (JPC)</p>	Representatives of: <ul style="list-style-type: none"> - The Participating Countries - The Donors - The Sponsoring Agencies 	<ul style="list-style-type: none"> - Overall policy, operational and budgetary authority - Approves Plan of Action and Budget (meets once a year)
 <p>World Bank: Fund mobilization and Trust Fund administration</p> <p>Committee of Sponsoring Agencies (CSA)</p>	Representatives of UNDP, FAO, World Bank and WHO (meets several times a year)	Review of management/budget matters and of JPC docs; can provisionally authorize supplementary budgets; supports socio-economic development
 <p>Programme Director HQ in Ouagadougou</p>	Supported by Units of: <ul style="list-style-type: none"> - Vector Control - Epidemiological Evaluation - Biostatistics and Information Systems - Devolution - Administration & Management 	Responsible to JPC for all OCP activities <ul style="list-style-type: none"> - Planning and programming - Operations - Budget and Finance - Reporting
 <p>Expert Advisory Committee (EAC)</p> <p>Ecological Group</p>	12 members; <u>Ecological Group</u> (5 members) is a subgroup of EAC	<ul style="list-style-type: none"> - Technical audit of CCP - Advise to Director and JPC through CSA (meets once a year)
 <p>National Onchocerciasis Committees (NOC)</p>	One in each of the Participating Countries. High-level representatives meet once a year	<ul style="list-style-type: none"> - Facilitate liaison between OCP and national authorities - Promote OCP activities

ONCHOCERCIASIS CONTROL PROGRAMME ORGANIZATIONAL CHART



Annex 5

List of Donors to the Onchocerciasis Control Programme
in West Africa (OCP)

African Development Bank
Belgium
Calouste Gulbenkian Foundation
Denmark
France
Germany
Italy
Japan
Republic of Korea
Kuwait
Luxembourg
Netherlands
OPEC Fund for International
Development
Portugal
Saudi Arabia
Switzerland
UNDP
United Kingdom
USA
WHO
World Bank

May 1993

Costs of operations and proportional share by principal activities
(US \$ million)

	1st Financial Phase (1974-1979)	2nd Financial Phase (1980-1985)	3rd Financial Phase (1986-1991)	Grand total (1974-1991)	1992 (approved)	1993 (approved)
<u>Total</u>	56.1	106.9	177.4	340.4	32.5	29.7
<u>Vector control</u>						
- expenditures	36.1	69.8	126.1	232.0	22.4	18.2
- proportion of total	64.4%	65.3	71.1%	68.2%	68.9%	61.3%
Epidemiological evaluation	2.6 4.6%	3.5 3.3%	6.9 3.9%	13.0 3.8%	1.8 5.5%	1.7 5.7%
Biostatistics & information systems	-	-	1.0 0.6%	1.0 0.3%	0.3 0.9%	0.3 1.0%
Devolution	-	-	-	-	1.0 3.1%	1.4 4.7%
Management/support (of which Director's office)	8.6 15.2%	14.4 13.5%	21.6 (7.1) 13.2% (4.0%)	-	3.3 (0.7) 10.2% (2.2%)	2.9 (0.6) 9.8% (2.0%)
<u>MCP (former OCT)</u>	-	7.1 6.6%	12.5 7.0%		2.2 6.8%	3.7 12.5%

Annex 7

<u>Employed by WHO/OCP</u>				<u>STPs¹</u>	<u>Nationally employed</u>		
	<u>Professional</u>	<u>General Service</u>		<u>Total</u>		<u>Full time</u>	<u>Part time</u>
		<u>WHO status</u>	<u>National status</u>				
<u>VCU</u>	14 ²	110	223	347	7	244	
<u>EPI</u>	2	18		20	2-3	23	88
<u>DEV</u>	5	2		7	2-3		
<u>BIS</u>	1	2		3	1		
<u>OCT</u>	1	1		2			
<u>DIR</u>	2	5	1	8	1		
<u>ASS</u>	6	52	33	91			
Grand total	31	190	257	478	13-15	267	88

¹ Short-term professionals

² including hydrology: 1 professional hydrologist (Odienné), 2 hydrology brigades (Kara & Odienné) and 4 hydrology teams (2 in Guinea, 2 in Sierra Leone)
hydrobiology: 1 professional hydrobiologist, 2 assistants and 2 laboratory assistants.