



ONCHOCERCIASIS CONTROL PROGRAMME
IN THE VOLTA RIVER BASIN AREA

OCP/STAC/7.3

ORIGINAL : ENGLISH

SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE

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ECOLOGICAL PANEL FOR ONCHOCERCIASIS CONTROL
IN THE VOLTA RIVER BASIN AREA

REPORT OF THE EIGHTH SESSION

Rome, 29-30 May 1978

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A. OPENING OF THE SESSION

1. The eighth session of the Panel was held in FAO Headquarters, Rome, from 29 through 30 May 1978. The Panel was welcomed to Rome by Mr. T.S.B. Aribisala, who underlined the importance which the Steering Committee attached to the independent judgements of the Panel on the ecological aspects of OCP activities.
2. The session was held under the Chairmanship of Prof. Dr. J.H. Koeman.

B. ADOPTION OF THE AGENDA

3. The following agenda was adopted:
 1. Opening of session.
 2. Adoption of the agenda.
 3. Matters arising from the previous session:
 - a. Progress on data computerisation (para. 5);
 - b. Location of "control" river (para. 6).
 4. Review of Programme activities.
 5. Ecological Panel Report to Joint Coordinating Committee and JCC comments.
 6. Aquatic monitoring:
 - (i) Annual Report (Paper prepared by Mrs. B. Walsh);
 - (ii) Report of Hydrobiology Meeting in Ouagadougou;
 - (iii) Biological data on various rivers (Paper by Ms. Lyse Godbout);
 - (iv) OCP Evaluation Report;
 - (v) Discussion of FAO Fisheries Department Bulletins.
 7. Evaluation of environmental hazards from the use of Abate in Simulium control.
 8. Environmental manipulation - elements of a pilot "mechanical control" project.
 9. Monitoring ecological change due to human settlement.
 10. Crop rotations and farming systems in the Programme area and available sources of research and extension results in similar agro-ecological zones.
 11. Long-term outlook - success or failure.
 12. Other matters.
 13. Arrangements for the next session.
 14. Adoption of the report.
 15. Close of session.

C. MATTERS ARISING FROM PREVIOUS SESSION

4. Progress on Data Computerization

The aquatic monitoring data is being sent regularly to Geneva and is being stored on punch cards. The regular computer printout has been suspended as there appears to be a number of errors in the transcription of the original data which have to be corrected before any meaningful analysis can be undertaken.

An OCP statistician has yet to be appointed. As an adjunct to the central system, two mini-computers have been purchased to allow the hydrobiologists to compute their own relatively unsophisticated calculations of coefficients of condition and standard statistical tests of means and deviations, etc.

5. The Panel believes that the analysis of the aquatic monitoring data is essential to ensure the good management of the spraying operation and the prevention of irreparable damage to the environment. It is suggested that a specialised working group should be asked to review the present mass of raw data; to establish guidelines for the handling and analysis of data; to identify additional data which may be needed; and to determine the long-term requirements of the OCP in monitoring the ecological effect of the Programme.

6. While the Panel accepts the need to use specialised foreign institutes and/or consultant services to complete the initial analysis of the raw data, it hopes that this will be completed and that due consideration will be given in the medium term to establishing regional or national competence, through training programmes and through the strengthening of hydrobiological facilities in the participating countries.

7. Location of a "Control" River

The need to compare the ecology of rivers "before and after" treatment has been recognised. Such monitoring has been carried out on three rivers - the Bagoé, the Oti and the Red Volta. The hydrobiologists have also studied both the fish and the invertebrate fauna of two rivers formerly outside the Programme area.

8. The Panel considers that it is impossible to find a permanent "control" river within the Programme area. No standard/stable eco-system exists so that the best points of reference are the "before" situations of the rivers which are coming into the control campaign. A minimum of one full year or season of "before" monitoring should be planned. The Panel recommends that the monitoring also include observation of terrestrial fauna as the OCP is now considering a possible adulticide programme particularly in relation to the reinvasion problem (to kill the migrating parous females when they rest before oviposition).

9. The Panel suggests that OCP makes every effort to collect hydrobiological information available from studies carried out in Simulium damnosum infested valleys both within and outside the present Programme.

D. REVIEW OF PROGRAMME ACTIVITIES

10. In 1977 the OCP extended its activities to cover all parts of the original area (Phases I, II and III) except the eastern-most river in Benin, the Sota, which was not treated until March 1978. A study of the requests for extension was resented to the JCC at its Kuwait meeting in December 1977.

11. The JCC agreed to the immediate extension of the Programme in Ivory Coast, where the rivers of the Bouaké gap had been shown to be a source of re-invading flies. This area of 120,000 km² will be brought under control in two parts; firstly, the Marahoue and Sassandra rivers in 1978 and, secondly, the

Nzi, lower Bandama and lower Comoe rivers. Detailed entomological hydrological and epidemiological studies were authorised for the savanna located to the south of the original OCP area in Ghana, Togo and Benin. In 1948 the rains arrived about 6 weeks earlier than in previous years and have been heavier. Reinvasion of the upper Bandama and Leraba valleys began in early April and continued despite the extension of control to the Marahoue valley. However, with the control extension reinvasion of the Leraba system appeared to have been greatly reduced. Intensive studies by the Programme staff and three consultant entomologists are underway and the control of the upper Sassandra basin is scheduled for 6 June. Careful evaluation of the data should give further valuable information on flight direction and distance covered.

12. It was explained that this reinvasion by significant numbers of flies probably affects 27% of the Programme area. Flies appear to move from the SSW or SW to the NNE or NE on the monsoon winds. Only 2 savanna species of the complex S. damnosum s.s. and S. sirbanum are known to migrate in this manner. The main rain forest species S. sanctipauli appears to be non-migratory. Thus it is not necessary for the Programme to extend its control to the Atlantic coast in order to achieve success.

13. The Panel wishes to commend the OCP for its continued study of the complex problem of the reinvasion, which is a key factor for the future success of the Programme. This study should not be relaxed. The Panel discussed the eventual possibility of a "border treatment" proposal be looked at, in the light of the knowledge and/or experience of the effect of the insecticide on non-target organisms, on ecological balance and the possible development and spread of resistance, at that given time.

E. ECOLOGICAL PANEL REPORT TO JOINT COORDINATING COMMITTEE AND JCC COMMENTS

14. The Panel studied both the presentation of its activities to the JCC and the JCC's reactions as contained in the Independent Chairman's report. It was noted that the presentation had provoked the thoughts of many delegations which in itself can be considered a positive benefit. The Panel was surprised to note that some members of the JCC were unclear as to the role of the Ecological Panel which is clearly stated in its terms of reference. The Panel looked at some of the criticism (JCC Report para. 7.9) that it should not have made general statements on ecological aspects of human settlement, etc; the Panel has a clear mandate in this respect which goes well beyond the ecological implications of the vector control operations.

15. In respect of paragraph 7.8 of the JCC Report, the Panel would propose responding by selecting one or two development projects (preferably with an international aid component) from the lists prepared by the Economic Development Unit of OCP and to study these in detail to see whether the ecological implications have been or will be taken into consideration in the formulation and/or execution of the project.

16. Referring to paragraph 7.11 of the JCC report, the Panel does not believe that there is any contradiction between its views and those of STAC. Both EP and STAC believe that genetic resistance to the toxic effects of Abate

at present concentrations within S. damnosum is most likely to develop relatively slowly. However it is likely that should genetic resistance develop, it could spread rapidly due to the remarkable mobility and rapid breeding potential of S. damnosum.

17. Regarding the suggestion in paragraph 7.12 of the JCC report the Panel considers isotopic marking techniques both too expensive and too hazardous to be employed in the Programme area. The Panel continued to underline in its recommendations that governments should give priority to organised or technically-assisted resettlement of oncho-freed lands. Uncontrolled land clearance, over-cropping, over-stocking could all contribute to a rapid degradation of the existing natural resources. The government agencies should assist farmers by offering technical advice on measures which will enhance rather than destroy these natural resources. Economic crops, rather than simple subsistence farming, will provide an income from which some soil and water conservation measures can be financed (diversion channels, water retention measures, drainage works, fertilizer and green manuring, etc.).

F. AQUATIC MONITORING

19. The Panel reviewed the Annual Report prepared by Mrs. Walsh on her studies on the Red Volta, the only non-permanent stream studied so far and noted that the results were comparable with those carried out by the Bouaké and Tamale Groups on permanent rivers in the OCP area. There was a reduction of approximately 30% in the abundance of organisms but not in the variety of species. The period of observation was the rainy season, as the river flow is interrupted for a period of some 5-7 months each year.

20. While reviewing the report of the hydrobiologists meeting, the Panel noted that the hydrobiologists are expected to present their findings on an annual basis. The Panel feels that the external variants are so many that significant conclusions cannot be drawn in such a short time span and they would recommend that a synthesis of the results of the first three years' work be prepared in order to reach some main conclusions which could be meaningful in the overall management of the Programme.

21. In view of the lack of complete knowledge of the biology of the tropical stream situation, the Panel feels that it is essential for the Programme to continue with its monitoring activities of both invertebrates and fish species. It would also commend to the Programme that as much of this material as possible be published in technical journals.

22. The Panel was informed that the exact feeding habits of the fish species are not known, although it appears that the fish obtain much of their food from the debris from the forest gallery, rather than from the benthos. Many fish species have been known to move 200-500 km. upstream in the rainy season and would thus be unaffected by the dry season vector control programme. During the rainy season they may be present in the area more for the purposes of reproduction and to avoid other unfavourable conditions lower down the stream than for the purpose of feeding.

23. The usefulness of the fish fecundity studies was questioned. The hydrobiologists should be asked to clarify the purpose and importance of such studies.

The Panel feels that a more significant index would come from "fry counting". It may not be that important to identify the species among the fry caught in the samples.

24. The Panel would question whether any information is available on the effect of Abate on eggs and small fry. The Panel accepts that it is a difficult subject to study as there is normally a high mortality rate even without the presence of Abate or other larvicides in the system.

25. In reviewing paragraph 4(d) of the hydrobiologists report, the Panel would not dispute the statement that the PUE (fish caught per unit of effort) may have been progressively reduced over the last two years; however, it does not believe that this is conclusively the result of the larvicidal treatment. The effect of a low rainfall year can reduce the PUE by upto 50%; similarly, an increase in the numbers of fishermen could reduce the PUE while the actual production may remain constant.

26. The yield of the rivers is considered an important index. Details were given of an FAO-developed "frame" survey whereby the area is surveyed from the air to locate and count the huts in any temporary fishing village. Then sample surveys of fishing villages and fish catches are undertaken and extrapolations made to obtain figures of yield. The example of such a survey on the Pendjari river in Benin was given. It is suggested that OCP and FAO's Fishery Resources Division should cooperate in introducing similar surveys along other main fish producing parts of the treated river system. A visit of an FAO Fisheries Biologist to the Programme area might be scheduled at the same time as the meeting of the hydrobiologists annual meeting in January 1979.

27. Concerning the chemical monitoring of the river systems, the Panel believes that it is essential to strengthen these activities and that the first question is to select a satisfactory protocol. The chemical analysis of Abate worked out by the CDC Laboratories at Atlanta is adequate but that simpler alternatives, such as the thin layer method should be explored. The Panel recommended that as soon as possible these methods should be transferred to a national laboratory in the participating countries. Training may be required to upgrade the local staff and some additional equipment may be required. Assistance could be sought from the Agricultural University, Wageningen, for the training of national chemists in chromatographic methods of analysis both for Abate and other agricultural or public health chemical compounds in the river system. The selection of test organisms is important, one of which might be a mollusc as these do not migrate and will receive the full dose of larvicide. It should be remembered, however, that molluscs, having less fatty tissue than fish, will only retain about 50% of the larvicide that might be absorbed by most fish species.

28. The Panel suggested that UNEP be approached to assist the OCP in monitoring the water quality of the streams in rural areas which are subjected to regular larvicidal applications.

29. The Panel would recommend that simultaneous chemical analysis of both environmental and spiked samples be carried out in a foreign laboratory and in the selected national laboratory(s) during the change-over period.

30. The Panel took note of the interesting report prepared by Ms. Lyse Godbout on streams in the east and the south of the Programme area. The results of this study in general conform with previous findings both in respect of the similarities and differences experienced in the various river systems. The Panel feels that this is a valuable piece of baseline work which will be of use later in the Programme. The Panel noted that the sampling times do not coincide with the standard sampling times according to the OCP protocol so that any follow-up work should use the same sampling times if the work is to be comparable. The Panel would recommend that the referenced collection be lodged with Dr. Dejoux at Bouaké who has been mainly responsible for the OCP taxonomy work.

31. The Panel was interested to note two documents submitted for their information by the FAO Fishery Resources Division. It is hoped that advantage will be taken by OCP of the valuable indices, etc. and methodology which has been worked out for conditions very similar to those prevailing in the Programme area. The discussion of this item also highlighted the effect of human settlement on the PUE as well as on the cutting of the forest gallery which will seriously reduce the allochthonous food for many fish species. It is recognised that cutting the forest gallery increases the stream temperature which in turn can inhibit fish breeding.

32. The Panel was sorry to learn of the death of Daniel Adu, a technician of the IAB, while working on monitoring work in the Programme area.

33. The Panel was interested to see the portion of the draft OCP evaluation report which deals with ecological matters and would suggest that a more quantitative data on numbers of sites and samples be given.

G. EVALUATION OF ENVIRONMENTAL HAZARDS FROM THE USE OF ABATE IN SIMULIUM CONTROL

34. A draft paper on this subject which had been prepared by the Chairman was discussed. The hydrobiologists had noted that during the aquatic monitoring activities that there was a change in the quality of the environment but the question remains as to whether or not the change is acceptable. In view of the fact that no change in the fish populations has occurred at the present dosage rates of Abate, the Panel considered it unnecessary to undertake very tedious, costly and untried investigations of the benthic reductions. However, the Panel took careful note of the hydrobiologists remarks and believed that it would be well worth re-evaluating the Abate situation. The Chairman's draft forms a good framework on which OCP and other interested bodies may wish to build. The paper should include the effects on both mammalian, other vertebrate and invertebrate species. Notes might also be included on agricultural usage, different formulations and information on resistance. The Panel proposes to review an extended version of the present paper at its next meeting. Those interested in contributing to this effort should address themselves to the Chairman.

H. ENVIRONMENTAL MANIPULATION

35. While the present aerial application of larvicide can be shown to be the only broadly applicable and cost effective method of controlling Simulium in the OCP area, the Panel is cognisant of the need to reduce the environmental impact

of insecticidal treatments wherever possible. Alternative methods, like ground application, may be possible and economic in such sites which are isolated in the dry season. Some ground control and mechanical habitat modification should be considered at sites which are intrinsically difficult to treat using aircraft.

36. The Panel feels that OCP should give some thought to increasing popular participation in the Programme's activities by keeping the people informed, through their National Onchocerciasis Committees (NOCs), of measures which will help control the black flies around the villages, keeping banks of rivers clean, removing small breeding sites, proper maintenance of dam spillways, etc. The Panel believes that there is a need for a simple explanatory document. Dr. Obeng has accepted to prepare a short draft along the lines discussed by the Panel. The OCP should explore with the NOCs means to involve the local populations in the Programme.

I. MONITORING OF ECOLOGICAL CHANGE DUE TO HUMAN SETTLEMENT

37. The Panel had before it a short letter from Dr. David Hall of the Ministry of Overseas Development, London, which exemplified the response received from many correspondents on the question of monitoring ecological change. The Panel accepted his point that one can only draw up a very complex matrix of factors and effects and that this must then be applied to the given circumstance at a point in time. The Panel therefore believes that attempts at a comprehensive measurement of ecological change would be of no practical value in view of the variables involved.

38. The Panel believes that governments and organizations concerned should recognise that certain fundamental rules for the protection of the natural resources (soils, water, vegetation and wildlife) cannot be overstated. The Panel noted the criticism of some members of the JCC when it was felt that the Panel was stating the obvious as despite the reiteration of the basic rules the conditions in and around settlement schemes do not seem to improve.

J. CROP ROTATIONS AND FARMING SYSTEMS IN THE PROGRAMME AREA

39. The Panel took note that contacts with the outreach station of the International Crop Research Institute for the Semi-arid Tropics seemed to be bearing fruit. The station is now fully staffed and is working on crop rotations and farming systems which will be of immediate interest to much of the OCP area. Research stations in similar agro-ecological zones have been identified and details of their programmes will be collected and a consolidated discussion paper will be prepared for the next session of the Panel. Dr. Smith has undertaken to coordinate this work.

K. LONG-TERM OUTLOOK - SUCCESS OR FAILURE

40. The Panel considered a letter from the World Bank requesting its comments on the ecological implications of economic development in the hypothetical situation of (a) failure in the disease control and (b) the continued presence of the blackfly after 20 years if larviciding were to be discontinued at this point.

41. The Panel found that they could not give a generalised answer under either hypothesis. The ecological implication of a failure to control the disease would have to be discussed on an actual case by case basis. The basic question of failure to control the disease is more within the competence of STAC. However, the Panel considered that the experience to date augers well for a significant interruption in vector transmission.

42. In respect of the second hypothesis, the Panel wished to underline that the purpose of OCP is to control the disease and not the eradication of the blackfly. The Panel would expect that with the discontinuation of larviciding, simuliid flies would re-establish themselves in the eco-system though possibly in not such a numerically important position. In the course of OCP activities much valuable information is becoming available on the biting habits of the flies. Tropical applications of adulticides/larvicides, the use of protective clothing, improvement of domestic water supplies (less time spent at the river's edge), etc., will all help to reduce the nuisance caused by these biting flies.

L. OTHER MATTERS

43. The Panel wishes to acknowledge the valuable contribution made to its work by Dr. H.B.N. Hynes, to extend to him every best wish for his sabbatical studies in Tasmania and hoped that he might be associated with OCP work again in the future.

M. ARRANGEMENTS FOR NEXT SESSION

44. The Panel would propose meeting about the same time next year, the exact time and place to be determined through consultation between the Chairman, the members and FAO (as EP convenor).

N. ADOPTION OF THE REPORT

45. The Panel reviewed and adopted the present report.

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