

Conservation of Nature and Natural Resources in modern African States

Report of
a Symposium organized by CCTA and IUCN
and held under the auspices of FAO and UNESCO
at Arusha, Tanganyika, September 1961



Published with the financial aid of UNESCO

International Union
for the Conservation of Nature and Natural Resources,
Morges, Switzerland 1963

The International Union for Conservation of Nature and Natural Resources (IUCN) was founded in 1948 and has its headquarters in Morges, Switzerland; it is an independent international body whose membership comprises states, irrespective of their political and social systems, government departments and private institutions as well as international organisations. It represents those who are concerned at man's modification of the natural environment through the rapidity of urban and industrial development and the excessive exploitation of the earth's natural resources, upon which rest the foundations of his survival. IUCN's main purpose is to promote or support action which will ensure the perpetuation of wild nature and natural resources on a world-wide basis, not only for their intrinsic cultural or scientific values but also for the long-term economical and social welfare of mankind.

This objective can be achieved through active conservation programmes for the wise use of natural resources in areas where the flora and fauna are of particular importance and where the landscape is especially beautiful or striking or of historical or cultural or scientific significance. IUCN believes that its aims can be achieved most effectively by international effort in cooperation with other international agencies such as UNESCO and FAO.

The World Wildlife Fund (WWF) is IUCN's chief source of financial support. WWF is an international charitable foundation for saving the world's wildlife and wild places. It was established in 1961 under Swiss law and shares joint headquarters with the International Union for Conservation of Nature and Natural Resources. Its aim is the conservation of nature in all its forms —landscape, soil, water, flora and fauna— by fund raising, publicity, and the education of the general public and young people in particular. It does not normally conduct field operations but works through competent specialist or local organisations. Its projects cover a very wide range, from financial support for the vital scientific and technical programmes of recognised bodies such as IUCN and ICBP (International Council for Bird Preservation) to emergency programmes for the safeguarding of animal and plant species threatened with extinction. It also makes contribution towards the establishment and management of areas as national parks and reserves, and to ecological studies and surveys. WWF's fundraising and publicity activities are mainly carried out by National Appeals in a number of countries, and its international governing body is made up of prominent personalities in many fields.

Fondée en 1948, l'Union internationale pour la Conservation de la Nature et de ses Ressources (UICN), dont le siège est situé à Morges, Suisse, est une institution internationale indépendante. Elle est composée d'Etats membres, sans discrimination de systèmes politiques et sociaux, de services administratifs et techniques gouvernementaux, d'institutions privées ainsi que d'organisations internationales. Elle groupe tous ceux que préoccupe le bouleversement du milieu naturel par l'homme, résultant de l'expansion urbaine et industrielle rapide et de l'exploitation excessive des ressources naturelles, qui sont les fondements de la survie même de l'homme. Le but principal de l'UICN est de promouvoir ou de soutenir toute action devant assurer, sur le plan mondial, la pérennité de la nature à l'état sauvage et des ressources naturelles renouvelables, non seulement pour leurs valeurs culturelles ou scientifiques intrinsèques mais aussi pour le bien-être économique et social qui en découle à long terme pour l'humanité.

Ce but peut être atteint grâce à des programmes de conservation visant à une utilisation rationnelle des ressources naturelles renouvelables, spécialement dans les régions où la flore et la faune revêtent un caractère d'un intérêt particulier, où le paysage est d'une beauté exceptionnelle ou saisissante ou représente une valeur soit historique, culturelle ou scientifique. L'UICN est convaincue que ses objectifs peuvent être atteints avec succès par un effort international déployé en coopération avec d'autres agences internationales comme l'UNESCO et la FAO.

La contribution la plus importante aux activités de l'UICN est apportée par le World Wildlife Fund (WWF). Le WWF est une fondation de bienfaisance vouée à la sauvegarde de la faune sauvage et de son habitat dans le monde entier. Il fut créé en 1961 comme fondation de droit suisse et partage à Morges le même siège que celui de l'UICN. Son but est de conserver la nature sous toutes ses formes — paysages, sol, eaux, flore et faune. Pour y parvenir, il organise des collectes de fonds, des campagnes de propagande et d'éducation du grand public et de la jeunesse tout particulièrement. En général, le WWF n'entreprend pas lui-même d'opérations sur le terrain mais il agit par l'intermédiaire d'organisations spécialisées ou locales compétentes. Ses projets couvrent un vaste champ d'action allant de l'appui financier apporté aux programmes scientifiques et techniques vitaux d'organisations spécialisées telles que l'UICN et le CIPO (Conseil international pour la Protection des Oiseaux) jusqu'au financement de programmes d'urgence destinés à sauvegarder des espèces animales et végétales menacées de disparition. Il contribue aussi à l'établissement et à l'aménagement de régions en tant que parcs nationaux et réserves et à des études et enquêtes écologiques. Les collectes de fonds et les activités de propagande du WWF sont exécutées principalement par ses sociétés auxiliaires nationales, existant déjà dans plusieurs pays. L'autorité supérieure du WWF est le Conseil d'Administration international, qui est composé de personnalités éminentes dans de nombreux domaines.

Conservation of Nature
and Natural Resources
in modern African States

Compiled by
Gerald G. Watterson
with the help of other members of the
IUCN Secretariat

Conservation of Nature and Natural Resources in modern African States

Report of
a Symposium organized by CCTA and IUCN
and held under the auspices of FAO and UNESCO
at Arusha, Tanganyika, September 1961



Published with the financial aid of UNESCO

International Union
for the Conservation of Nature and Natural Resources,
Morges, Switzerland 1963

TABLE OF CONTENTS

	Page
Preface	7
Chapter I Origin and Aims	9
Chapter II Highlights and Achievements	13
Chapter III The Discussions:	
A. The Present Role of Natural Resources :	
1. Conservation of the Habitat	17
2. Wildlife Utilization	19
B. Research, Conservation and Development:	
3. Research	25
4. Conservation and Development	28
5. Staff and Staff Training	32
C. The Place of Nature Conservation in land use Planning:	
6. Relationship of Wild Animals to Forestry Agriculture, Animal Industry and Disease	38
7. Human Ecological Factors	43
D. Wild Fauna and Flora as a Cultural and Economic Asset:	
8. Cultural Values	47
9. Integration with Economic Development	49
E. Local Human Attitudes and International Interest:	
10. Local Attitudes to Natural Resources and their Use	52
11. Developing an appreciation for the need to conserve nature and natural resources	54
12. International aid for Conservation	59
Chapter IV The Conference Tours	65
Chapter V The Recommendations	69
Chapter VI The Follow-up : ASP Stage III	73
Appendix : The Conference Papers	79
Alphabetical list of Authors	359
Bibliography	362

PREFACE

The contents of this publication are designed both as a summary report of the CCTA/IUCN Symposium on the Conservation of Nature and Natural Resources in Modern African States (the Arusha Conference),—and as a handbook of the essential information available to-date, to which interested Governments may refer when they wish to examine the question of including their wildlife resources as an integral part of the overall effort toward economic development of their country.

Each item on the agenda of the Arusha Conference is dealt with as a separate chapter, the contents of which are based on the papers submitted and discussions that took place on the subject.

The aim is to present as shortly as possible the main points of interest and important issues reflected in these papers and discussions, leaving it to the reader who wishes to go on to examine the facts and figures supporting the argument on a particular topic to refer to the relevant papers. These are in alphabetical order of authors.

Other chapters give some account of the study tours undertaken by the participants, set out the recommendations made by the Conference and introduce the "follow-up," IUCN's plan, known as African Special Project Stage Three (ASP III), for initiating the implementation of these recommendations.

The following passages, which originally formed a preamble to the Conference's recommendations, are brought forward here to give them prominence :

The participants at the Meeting express their sincere gratitude to the government of Tanganyika for the hospitality extended to them and the magnificent facilities made available during their visit to Tanganyika.

They wish to thank H. E. the Governor of Tanganyika for the keen interest he showed in the meeting and for his brilliant introductory address. They congratulate the Prime Minister of Tanganyika on

his manifesto which they feel will mark a turning point in the appreciation of the problems of the conservation of natural resources in Africa.

They further wish to thank the Tanganyika and Kenya authorities for their generosity in organizing, for the benefit of all participants, the highly successful Conference Study-Tours.

CHAPTER I

ORIGIN AND AIMS

The Arusha Conference was not a "once for all" episode in the history of African conservation. It was one stage in a sequence of activities which had been thought out in advance and had commenced more than a year before Arusha, and is now proceeding steadily with increasing momentum.

The plan for an African Special Project was conceived by IUCN at its General Assembly and Technical Meetings held in June 1960 at Warsaw and Cracow, in Poland. At that time, an impartial assessment of world-wide wildlife conservation problems had led IUCN to the conclusion that the accelerated rate of destruction of wild fauna, flora and habitat in Africa—without adequate regard to its value as a continuing economic and cultural resource—was the most urgent conservation problem of the present time. The destruction of this asset, which includes the finest and most varied large animal populations remaining on earth, would be a biological and cultural catastrophe. To a large extent, these great and unique faunal and floral resources could become exhausted merely because the indigenous people had not had adequately demonstrated to them methods to maintain maximum economic and cultural benefits from them. Wildlife is Africa's most neglected but potentially one of its most valuable renewable natural resources, and one that could be wisely utilized for the benefit of countries so fortunate to possess it. The problem is a two-fold one : first, conservation of the national parks and faunal reserves; and second, the management of wildlife stocks on lands outside the existing parks and reserves, especially on those lands not suited to agriculture.

A plan was worked out by a small group which, converted into the ASP Committee of IUCN and with an increased membership, still continues to guide the activities of the project as a whole. The Chairman of this Committee is Dr. E. B. Worthington, Vice-Chairman Dr. F. Bourliere, and Secretary Sir Hugh Elliott, IUCN Liaison Officer (formerly

George Treichel, Staff Ecologist of IUCN). Its members include Africans as well as Europeans, with FAO, UNESCO and CCTA/CSA represented by observers. Quoting from the original report of this group :

" The special purpose of the project is to inform and influence public opinion through its leaders and responsible persons in the Governments, that the application of conservation practices based on ecological knowledge, is in the best interests of all African countries . . .

Conservation in this sense applies to water, soils, vegetation, and wildlife, although special attention will be given initially to the large mammals which provide an important natural resource, but which are seriously endangered in many areas. This project will be focused primarily on the wild habitats, including National Parks, Fauna Reserves, Nature Reserves, and also other areas of wild land which, under management, are capable of producing crops of animal protein and other wild products on a sustained yield basis. "

The project was conceived originally in three stages, the first stage which was undertaken in late 1960 and early 1961, consisted of a series of visits to discuss the principles and practices of conservation with Governments in Africa and the leaders of local opinion. The person mainly concerned in this, whose services were provided by FAO, was Mr. G. G. Watterson, who was subsequently released by his Organization for a period of eighteen months to become Secretary General of IUCN. In several of the countries visited he was accompanied by Africans whose expenses were provided by grants made by the Fauna Preservation Society in London and the New York Zoological Society. Nearly every country of tropical Africa was visited in this way and a summary of the series of reports on them were published in *Oryx*. About the same time but through different initiative was published the report by Sir Julian Huxley following his study of conservation in East and Central Africa on behalf of UNESCO, and this also helped greatly in preparing the ground for the Arusha Conference.

The second stage of ASP was the Conference itself, the details of which were planned in advance by IUCN in close consultation with the other international agencies concerned, especially CCTA/CSA. This volume is a witness to the fact that it was a success and a landmark in the progress towards proper conservation of nature and natural resources in Africa.

The third stage of ASP, the conception of which is described more fully in Chapter VI, followed soon after the Conference. The ASP III team of consultants, consisting of two specialists with wide experience of

conservation and land use problems in Africa, Mr. Peter Hill and Mr. Thane Riney, began their series of visits to African countries in January, 1962. Each of these visits is designed to allow several weeks investigation, and is made at the specific request of Governments requiring consultation and guidance in framing their plans and programmes for the conservation and development of natural resources.

In 1961 the Executive Chairman of the United Nations' Technical Assistance Board had expressed interest in obtaining first-hand expert advice on projects the support of which would lead to the integration of Africa's wildlife resources into overall land-use planning and would contribute to the Region's economic and social expansion. At a meeting at FAO Headquarters in Rome with the Assistant-Director (Programme and Budget) and with the President and Secretary General of IUCN, he promised financial support for ASP Stage III, and designated FAO as the UN Agency immediately responsible for the handling of such funds.

Stage III is expected to last at least two years in order to comply with the requests from African Governments which are already to hand. If more assistance is requested it is hoped that arrangements can be made for it to continue longer.

Meanwhile a further stage in the follow-up activities, which is conveniently referred to as ASP IV, is now under active discussion. This consists of measures to carry out the projects in conservation which are prepared by the Governments after the consultations and surveys of ASP III. Thus unfolds the plan, and with it the recognition in Africa that the conservation and proper development of natural resources, the wild as well as the tame, is fundamental to the prosperity of mankind.

We cannot anticipate that the project as a whole can stop at Stage IV. There is still a huge field, largely unexplored, in conservation education and in the aesthetic appreciation of wild lands and wildlife. Fortunately in Africa this whole movement is backed by a steadily expanding income derived from the tourist industry, National Parks, and natural products.

CHAPTER II

HIGHLIGHTS AND ACHIEVEMENTS

" The survival of our wildlife is a matter of grave concern to all of us in Africa. These wild creatures amid the wild places they inhabit are not only important as a source of wonder and inspiration but are an integral part of our natural resources and of our future livelihood and well-being.

In accepting the trusteeship of our wildlife we solemnly declare that we will do everything in our power to make sure that our children's grandchildren will be able to enjoy this rich and precious inheritance.

The conservation of wildlife and wild places calls for specialist knowledge, trained manpower and money and we look to other nations to cooperate in this important task—the success or failure of which not only affects the Continent of Africa but the rest of the world as well. "

Tanganyika, September 1961.

J. K. NYERERE, Prime Minister

A. S. FUNDIKIRA, Minister Legal Affairs

T. S. TEWA, Minister Lands & Surveys

This Arusha Manifesto expresses in clear terms the attitude of the Host Government of Tanganyika toward the conservation and development of its wildlife and wildland resources. It epitomizes also the tone of the discussions throughout the Pan-African Symposium on the Conservation of Nature and Natural Resources in Modern African States, which constituted the second stage of IUCN's African Special Project (ASP).

The meeting, held in early September 1961 at Arusha in northern Tanganyika, was attended by 140 participants from 21 African and 6 non-African countries and 5 international organizations, not counting CCTA and IUCN who were jointly responsible for the preparation of the Conference. Among the participants were 15 " Fellows " from East Africa and the Rhodesias, Centrafrique, Dahomey, Tchad and Togo. Funds offered by the Governments of Sweden and Switzerland, UNESCO,

the Fauna Preservation Society, the Deutsche Afrika-Gesellschaft, and the American Conservation Association enabled the " Fellows " to attend.

Among the many messages of interest and good wishes for success that were sent to Arusha were those from H. R. H. Prince of the Netherlands and H. R. H. Prince Philip, Duke of Edinburgh.

In his opening Address to the Conference, Sir Richard Turnbull, then Governor of Tanganyika, who combines first-hand knowledge of the deterioration of the environment which has recurred in many parts of Africa with deep understanding of the human and social problems of modern African states, spoke in terms of the disaster which will inevitably descend on the people of a country if its natural renewable resources are not wisely managed. He stressed the fact that the conservation of wild animals, an undoubtedly great national asset, was dependent upon one overriding consideration—the conservation of the habitat. He acknowledged that in many areas man and his domestic animals were multiplying unchecked to bring about their own ultimate destruction by ruining forever the land on which they live. And after outlining the wildlife policy of the Government of Tanganyika and the various problems which this raised, he summarized the situation under three main considerations : (1) wildlife and wild nature were an undoubted source of revenue needed for the government's social services, and must therefore be rationally " exploited " where this was the best form of land use; (2) public opinion, whose support was essential, must be convinced of the value of this special African heritage; and (3) international aid would be needed if the world in general wished to see Africa's unique fauna preserved for the benefit of the people of Africa.

The joint organization of the meeting, under the co-sponsorship of FAO and UNESCO, boded well for the kind of international support that Sir Richard Turnbull deemed essential. Mr. J. S. Annan, of FAO, drew attention during the inaugural session to the senseless destruction of wildlife, coupled with inadequately planned land-use practices, which constituted a real threat to the natural resources of Africa. He pledged FAO's full cooperation and support in assisting Governments develop a rational approach to integrating the conservation and development of wildlife resources into their programs of economic expansion. Mr. A. Gille, of UNESCO, spoke in similar terms, giving special emphasis to the need for more scientific research and general education in the principles of conservation as a basis for intensified rational use of Africa's natural resources if the Continent was to take its proper place in international affairs.

The United Nation's Economic Commission for Africa (ECA) was also represented, and Mr. G. Bridger pointed out that his organization was already planning to conduct some research into the economics of tourism, based essentially on wildlife, in East Africa.

It was clear also that many non-governmental organizations such as IUOTO (International Union of Official Tourist Organizations), CIC (International Hunting Council), ICBP-CIPO (International Council for Bird Preservation) and the Fauna Preservation Society, were anxious to assist. And there were indications also of bilateral and private aid such as the funds given by the Frankfurt Zoological Society (via Dr. B. Grzimek) to erect a hostel for Tanganyika school children visiting the Serengeti National Park.

In the light of such numerous and diverse offers of technical and financial help, the Conference stressed the overriding need for ensuring that such necessary assistance be channelled in such a way as to avoid wasteful application, and thus encourage outside aid. It therefore warmly commended the implications of Stage III of IUCN's African Special Project (ASP) as an essential follow-up to the Conference and the change of attitude which the Conference has so clearly brought forth.

The establishment of the team of two specialist consultants, comprising this Stage III of IUCN's ASP, was considered as the only effective means whereby situations and needs in Africa could be analysed and properly assessed, priorities determined, and help from outside adequately and impartially channelled.

The two members of IUCN's African Special Project (ASP) team have now been appointed. They are Mr. Thane Riney, a land use and wildlife ecologist with considerable experience in Africa, Australasia and North America; and Mr. Peter Hill, a land use specialist who was previously Manager of the Experimental Station attached to the Department of Agriculture at the University of Ghana. This team started work in Africa at the beginning of 1962, and its programme is being planned in the light of requests for assistance which are regularly coming in to IUCN's Headquarters at Morges, Switzerland.

Other recommendations and wishes formulated by the Conference related (1) to the subject of international aid for education and training in conservation at all levels; (2) to land use policies which should aim at avoiding the intensive occupation of land unsuited for such use in the long term; and (3) to the need for greater attention to the economics of resource development programs. The Conference also expressed its congratulations to the Republic of the Congo (Leopoldville) for its

exemplary attitude towards its National Parks. Finally, the wish was expressed that countries assist in defining and preserving a systematic network of type habitats throughout the African continent.

As Professor Baer, President of IUCN, said during the inaugural session, " Man in the past, out of sheer ignorance or greed, has wastefully destroyed plant and animal life, forgetting that neither he nor his children's children can ever become completely independent of their environment, and overlooking the possible contribution that these now extinct forms might have made to his own welfare. "

The Conference was a milestone in the history of the development of an awareness of the need for the scientific conservation of nature and natural resources in Africa. In the words of Professor Theodore Monod, President of CSA and distinguished advisor to IUCN, " Tanganyika has every reason to be proud of the part she played in this big common effort, in hastening the day when Africa will be the shining example to the world of a continent which, fully aware of the incomparable, irreplaceable value of its natural wealth, has devised ways of wise husbandry, avoiding unneeded destruction and achieving a sense of interrelationship between man and his environment in the interests of its own peoples and of mankind in general. "

CHAPTER III

THE DISCUSSIONS

A. THE PRESENT ROLE OF NATURAL RESOURCES

1. CONSERVATION OF THE HABITAT

It is a phenomenon of natural habitats that they represent the maximum conversion rate or energy flow within the given climatic and physiographic situations.

F. Fraser Darling

Africa is characterized by great biogeographical diversity, a corresponding diversity in modes of life, and by the particular modifications brought about by local cultural evolution. These three factors clearly underline the complexity of the problem of conservation and rational use of Africa's natural resources.

Habitat is the totality of the environment in which plants or animals live in optimum conditions or as near optimum as can be reached for each species. If we accept the statement that a natural habitat represents the maximum conversion rate or energy flow within a given climatic and physiographic situation, its conservation and the study of the interactions of its components parts—physiography, geology, climate, and the unconscious cooperation between all the animals and plants within that habitat—is a fundamental first principle in maintaining populations of animals and plants, upon which in turn human populations depend.

We are only beginning to apprehend rather than comprehend the intricacy and delicacy of the poise of the world of nature. Each distinctive natural biological community represents an optimum system of conversion of matter, of circulation of energy, in which through evolution by natural selection and consequent differentiation, there is avoidance of competition. No two species fill exactly the same niche or perform exactly the same function, and each species is helping to conserve the habitat. Man is the most adaptable of all animals. There are few natural

habitats he cannot occupy either temporarily or permanently, adapting clothes and shelters to buffer the habitat in some measure. But if, in his lack of wisdom, man cuts down the number of species of animals in a habitat, he renders it harder to maintain, and it will support him less adequately. In a practical, economic example, this is why many so-called pastoral areas of Africa are breaking down. The twenty or thirty natural species of grazers and browsers have been replaced by two or three exotic species. The niche structure is so incomplete that degeneration of habitat takes place. And in many of the poorer lands of Africa, this spells rapid irrevocable and even total reduction of the capacity for supporting human life.

Habitat maintenance is consequently the very basis for conservation—and this includes conservation of wild animals. In the light of demographic expansion, it is usually impossible to avoid some interference in any given locality, whether or not such area is natural, nearly natural or transformed, since any biological community is a dynamic and changing association. The aim in conservation of natural resources is therefore to achieve the maximum wise use of land with the least possible damage to, or reduction of, the elements that maintain the habitat.

The countries of Africa have inherited frontiers that correspond neither to criteria of biological divisions nor to those of ethnic unity. Conservation is therefore an international problem. At the national level, again, there is a fundamental need for close cooperation and for integration of a wide diversity of interests and modes of living into an overall land use plan to promote the best long-term chances of economic and social development. Finally, within each community, there is a need for education to speed the process whereby certain dogmas and traditions which had their practical uses in earlier days, lose their force and harmfulness in the changing social conditions of modern times.

Discussion Leader:

Th. Monod, Director. IFAN, Dakar, Senegal.

Rapporteurs:

M. Cowie. Royal National Parks of Kenya, Nairobi.

J. Dorst. Mus. Nat. Hist. Nat., Paris, France.

Background Papers:

The Habitat, F. Fraser Darling. The Conservation Foundation, New York, U.S.A.

The Physical Environment and the Human Environment in West Africa, P. L. Dekeyser. IF AN, Dakar, Senegal.

The Fauna and Flora of East Africa, I. M. Grimwood. Game Department, Kenya.

2. WILDLIFE UTILIZATION

a) *Wildlife as a Source of Food*

Nowhere else in the world is so high a value of " wild " proteins in kg. per hectare found as in the African savannah.

F. Bourlière

Only by the planned utilization of wildlife as a renewable natural resource, either for protein or as a recreational attraction, can its conservation and development be economically justified in competition with agriculture, stock ranching and other forms of land use.

Tropical Africa is inhabited by the greatest populations of mammals, and especially of herbivores, in the world. Systematic research in recent years has brought to light the extent of this phenomenon and has enabled its characteristics to be defined. Some of the fundamental ecological features of the game populations, revealed by such studies, underline their potential economic implications and their rightful place as a resource in the increasingly competitive use of land.

The chief reason for the high values of standing-crop biomass per sq. km., as compared with those of more temperate climes, lies in the great variety of ungulate fauna cohabiting in the different " open " regions of tropical Africa. It is not unusual to find up to twenty species living together. These large numbers of far-ranging wild animals, unless denied their full ecological range, do not destroy their habitat. The total " load " of herbivores is distributed over the whole of the plant standing-crop biomass, and is not concentrated on a single constituent (the graminaceous carpet) as in the case of domestic livestock.

Another contributing factor lies in the greater nutritional efficiency of Africa's wild ungulates. This is indicated by the lesser development of their digestive tract, compared with those of domestic ungulates of comparable weight, implying a better utilization of plant food.

There are indications that a further point of interest is to be found in the rate of turnover of savannah populations of wild ungulates. Whereas the highest standing-crop biomass values observed in Africa correspond to populations where a high proportion by weight is made up of two slow-growing, late maturing species of large dimensions (the elephant and the hippopotamus), medium " loads " consist of a dominance of fast-growing and early-maturing small ungulates (antelopes) presenting a rapid rate of turnover, whereby the daily weight increase permitted by

the higher " nutritional efficiency " referred to above is generally greater than that of domestic species.

These considerations, to which must be added the remarkable resistance of many wild species to lack of free water, postulate that in many marginal areas the best use of land can be achieved by the maintenance of balanced populations of wild game. A higher yield of protein could be provided, whilst observing the basic principles of conservation, in many areas suffering from a lack of these nutritional elements.

The African is a realist. The use of game as a source of food is not only more easily understood than the idea of conserving wild animals for aesthetic, scientific or sentimental reasons;—it also fulfills in many instances a strong instinct and a way of life and, if properly controlled, provides the most effective instrument of management. The immediate problem lies in areas outside and adjacent to National Parks, where the survival of African wildlife depends ultimately on the cooperation of the peasant farmer, on the basis of multiple land use. The problem cannot be viewed in isolation; it must be considered in the context of a rapidly advancing tide of human population.

Management of wildlife involves a great deal of basic preliminary research, a study of the needs and way of life of the local communities involved, and their maximum possible participation in management projects. Many practical difficulties are inherent in cropping, processing and marketing the products of such schemes. Moreover, there are sociological problems also in overcoming atavistic and traditional preferences in human diet.

Whereas West Africa is still employing traditional methods of game control and cropping, experiments in East, Central and Southern Africa show that the harvesting of wild animals is feasible and can produce high yields of inexpensive meat. Much work is however required on techniques of cropping and processing, and detailed studies are needed on the economics of game utilization, on the disease aspect and on marketing facilities, before such projects can be more generally applied. The price of game meat must for instance be high enough to produce revenue of sufficient worth to interest local communities; yet the vital need for destocking of scrub cattle implies the application of artificially sustained prices for domestic meat. Under such circumstances, game cropping as a commercial enterprise is difficult unless left to private enterprise. Local meat surpluses present another problem which might be solved by their use as feed for an intermediate, non-grazing animal, producing additional protein-food whilst at the same time relieving pressure on pastoral

areas. Kenya's experience in the use of mobile processing plants for combined use in scrub cattle culling and game cropping, for the production of meat powder, is of particular value and interest in assisting to solve a whole range of difficulties, from preferences in human diet to the export of an easily transportable commodity to areas where it is most needed.

b) *Tourism and Recreation*

If the mass of my countrymen are to be enlisted in the ranks of conservationists, they will expect to see that what they are told is "their heritage," however valuable it may be as a cultural asset, can still be made to earn its keep. I believe it can—through tourism.

T. S. Tewa
Tanganyika's Minister of
Land and Surveys

One of the consequences of the increasing dissociation of man from his natural surroundings is an almost pathological attachment to animals. Never before in the five hundred thousand year history of mankind has there been a time when the majority of people were completely cut off from nature and animals. Zoos are therefore springing up all over the world, in the densest human conglomerations. The number has risen to five hundred, and more and more visitors are being attracted to them. An average of 330,000 annually visited the Frankfurt Zoo between 1930 and 1940. This average has now risen to 1.6 million.

At the same time, better standards of living, improved communications, greater leisure time and higher spending power are resulting in a steady increase in the world's tourist traffic. In recent years, tourism in Europe has risen 10 % annually. Revenue from tourism between 1950 and 1959 has increased tenfold in Greece and fourfold in Austria, Germany, Turkey and Portugal. In 1950, 302,000 Americans visited Europe and spent 358 million dollars, in 1959 three quarters of a million spent 931 million dollars. Italy had 365,000 beds for travellers in 1949 and 737,000 in 1959, representing an increase of 102 % which takes no account of the enormous increase in popularity of the tent and the caravan. In Austria during the same period the number of beds increased by 103 %, in Germany by 94 % and in Portugal by 134 %. Revenue from tourist trade in Greece amounted to 19 % of the total exports, in Italy 19 % and in Switzerland 16 %; and even in countries with a large trade

in other exports the proportion was still substantial: 12 % for France, 6 % for Denmark and 4 % for Germany.

With accelerated world wide urbanization, it is an established fact that an increasing majority of holiday-makers are now in search of beautiful natural scenery. Towns and famous buildings, cathedrals and art galleries are usually visited only en route. More and more people are looking for places where they can see animals in their true, wild environment. Africa, with its unique wealth of wildlife, therefore can and must share in this boom.

In 1959, the tourist traffic in East Africa brought in 22 million dollars, placing it at the top of the exports of these countries. The revenue value was exceeded only in Kenya by its coffee exports. But it is clear that tourism is only in its infancy in East Africa;—for the 6,853 Americans who came to East Africa in 1959 do not represent even 1 % of the 705,000 who left the United States for holidays abroad. The modern tourist, en masse, wants to see as much as possible, as rapidly and as comfortably as possible. The National Parks and reserves of Africa have a wonderful opportunity of filling a world need,—modern man's craving for contact with nature.

The development of tourist facilities does however require study and skill if the environment that the visitor comes to enjoy is not to be destroyed by the ill-considered, ill-designed spread of modern facilities.

According to South African experience, "to house a visitor to a National Park in such a way that he will return to that Park and recommend his friends to such sanctuary requires only about one third of the capital outlay required for tourists to other parts of the country." From this point of view alone, money spent on accommodations in a National Park is an excellent investment. As Tanganyika's Minister, responsible for wildlife, wrote : "One of our most urgent needs is an industry which can bring in large sums of money from outside while making the minimum demands on our slender resources for capital expenditure and for foreign exchange."

Tourism never supplants another industry; it supplements all other industries. Its great advantage over many other industries is that, properly managed, it can be expanded indefinitely without destroying or using up its natural assets. Furthermore, "domestic tourism" keeps money earned within a country circulating inside it, and simultaneously educates the citizens on the attractions of their own land. But there is no doubt that tourism is a great and keenly competitive international business. If its development is not to destroy its natural assets, it requires capital and full Government support. There must be adequate airport and

harbour facilities, good roads and transportation, good water supplies and well-designed, appropriate accommodation, electricity, cable and telephone facilities and sanitation. The incentive of a favourable "investment climate" is essential; formalities for outside visitors must be kept to a minimum; assistance is needed to advertise, publicize and promote tourist facilities to the fullest extent; and finally, remembering that the primary function of National Parks is to conserve the country's natural assets, adequate provision is needed for basic resource research; for skilled, appropriate development design and planning; for consumer research, for conditioning the tourist to the circumstances in the countries he is visiting, and for the development of measures to assist him in understanding what there is to see and appreciate.

The importance of not losing forever a heritage that still exists in the world cannot be overstressed. This can be achieved through planned and properly developed tourism, wherever game-meat production is a secondary or impossible alternative form of utilization.

There is one other important aspect of tourism, outside that of the purely economic advantage, which Minister Tewa of Tanganyika admirably summarized when he wrote: "As a newcomer among the independent nations, we need informed and sympathetic friends among the other countries of the world. We hope that those who have visited Tanganyika as tourists will go home with some insight into our problems, some sympathy with our aims and some liking for our people. This will be not the least of the benefits the wild animals can bring to our country." The full value of a visitor must not be measured merely by what he actually spends in a country. It is enhanced because he leaves as an informed ambassador. He has a wider knowledge not only of scenery, folklore and game but of standards, achievements and the problems which have to be faced.

As D. O. Mathews, representing IUOTO, wrote: "Nothing can contribute more than tourism to help the nations and peoples of the world appreciate and understand one another. Nothing can do more to smash economic provincialism which for so many centuries has fragmented the world.

"Tourism is therefore not only a great money-spinning industry, but also a benevolent force which can preserve international relations through better understanding."

Discussion Leader:

B. G. Kinloch. Game Department, Tanganyika.

Rapporteurs:

M. Cowie. Royal National Parks of Kenya, Nairobi.
 J. Dorst. Mus. Nat. Hist. Nat., Paris, France.

Backgrounds Papers:

The Wild Ungulates of Africa: Ecological Characteristics and Economic Implications, F. Bourlière. Faculty of Medicine, Paris, France.

Development and Utilization of Wildlife Resources in Uganda, J. H. Blower and A. C. Brooks. Game Department, Uganda.

Observations on number, mortality and reproduction of Elephants in Uganda, I. O. Buss, Washington State University, U.S.A.; and A. C. Brooks, Game Department, Uganda.

Wildlife Ranching in Southern Rhodesia, A. Mossman. National Museums of S. Rhodesia.

Wildlife Management in the Ivory Coast, G. Roure. Forest Service, Ivory Coast.

The Galana River Game Management Scheme, N. M. Simon. East African Wildlife Society.

The problem of the cropping of flechwe on the Kafue Flats, C. W. Benson. Game Department, N. Rhodesia.

Utilization of Wildlife in the Transvaal, T. Riney. National Museums of S. Rhodesia.

Value of the Tourist Industry, B. Grzimek. Frankfurt Zoo, Germany.

The Economics of Tourism in National Parks and Nature Reserves, R. Knobel. National Parks, S. Africa.

The Value of the Tourist Industry, D. O. Mathews. EATTA, Nairobi, Kenya.

The Value of the Tourist Industry in the Conservation of Natural Resources in Tanganyika, T. S. Tewa. Min. of Lands and Surveys, Tanganyika.

B. RESEARCH, CONSERVATION AND DEVELOPMENT

3. RESEARCH

If conservationists have a case that is worth making—and I believe we have—it must be made in terms of the renewable natural resources of the country we deal with and in terms of the greatest long term benefit to the people of the country, and our investigations should be planned with this in mind.

Thane Riney

If it is true to say that on many categories of marginal land, the utilization of existing plant resources by a spectrum of wild ungulates is more efficient than that by domestic animals, it is essential that such a statement be qualified by precise information obtained through research. Criteria must be established for determining the "degree of marginality" of land and its optimum use. Comparisons must be made of the efficiency of range utilization of domestic livestock and wild ungulates by obtaining evidence from comparisons of diet, digestive efficiency based on killing out percentages and visceral weight, water requirements, growth rates and liveweight gains, age of reproduction, disease relationships and standing crops. Much of Africa's rangeland is characterized by a rigorous climate and high vulnerability to overgrazing-induced erosion or desiccation. The maximum cash return per unit area is so small that it is often not economical to attempt range improvement for the relatively recently introduced domestic stock.

The major issues of Governments lie not directly with animals, vegetation or soil, but with people; and with developing some sort of stability for their economy under which all their human populations can thrive.

Two types of priority needs constitute the initial contribution to be made by wildlife conservationists in helping Government establish a rational land-use policy: the need to integrate closely the information gathered on animal surveys with the way in which the soil and vegetation is maintaining itself in the presence of the study populations;—and the need to make maximum use of the few workers available in Africa by developing rapid survey techniques.

No Government can afford to ignore the principle that whatever is done with land, the soil-vegetation complex will decline in productivity unless conservation values are maintained. If we want to keep steady, healthy populations of animals we must consistently maintain a suitable

habitat to support them. It is hard, then, to over-estimate the importance of surveys which show how habitats are maintaining themselves in the presence of a variety of animals, and how the animals are maintaining themselves within their habitats.

A rapid survey technique has recently been developed in Rhodesia for comparing conservation status under different kinds of land use and under different densities and combinations of animals. It records easily recognized and easily measured types of observations that reflect varying degrees of trouble from the standpoint of maintaining conservation values.

The importance of the conservation aspect for Africa's wild lands is that, no matter how valuable the wild land survey is today, it will be of no lasting help if lands alongside are going out of production; for sooner or later many wild lands containing large mammals will be desired for development as the only good pieces of country left. This potential danger should help fasten interest on lands adjacent to wild lands as well as on the wild lands themselves and emphasize the value of full cooperation and active collaboration with technicians interested in surveying and assessing renewable natural resources other than wildlife.

It is urgently important to develop and standardise ecological techniques, suited to the needs of field workers able and willing to collect the essential data, but with little time for or experience of its analysis. IUCN therefore contemplates the preparation of a handbook of survey and assessment techniques especially designed for use in Africa by biologists and the field staff of National Parks and Game Departments. The form of publication will be such as to allow for revision in the light of experience, but the degree of standardization aimed at should greatly facilitate comparison of data drawn from all parts of Africa.

Techniques developed by the Tanganyika Game Department in assessing and evaluating "carrying capacities" have shown the practicability of employing teams of Game scouts to obtain accurate routine information and thereby enormously reduce the time taken by the lone qualified worker who depends on his own resources to complete a field study programme. In the light of the present shortage of trained biologists, it is encouraging to note that the invaluable ability of relatively numerous but uneducated men to observe well can be channelled into research. Their particular qualifications are keen powers of sight and observation, a liking for the work, the ability to read and write and a proven reliability. Working in some 650 square miles of relatively undisturbed acacia savannah bush country of the type which extends over

much of northern Tanganyika and southern Kenya, systematic observations have been made daily by a team of fourteen such Scouts for a period of nearly four years. The method involves the use of fixed transect lines through the bush along which the men walk daily making accurate observations. These are compiled as statistical data on animal density, the species composition of the population and the sex and age grouping within each species, numerical fluctuations from year to year and through the seasons, habitat and food preferences. The Scouts are trained to recognize and give scientific names to the great majority of the plant species in the area and are skilled at making visual observations of the feeding habits of the animals.

Apart from the need for survey and assessment of resources as basic data for land-use planning—and eventually for resettlement of nomadic tribes in the interests of permanently improved levels of living, and of resource conservation, ecological research is required for habitat management.

It is the characteristics of the habitat which control the abundance of an organism living in that habitat. Soils, the composition and density of the vegetation, and the availability of water, determine its ability to support a certain number of each kind of animal without damage. The condition of the vegetative range indicates the relative abundance of herbivores foraging on it.

The carrying capacity of pasture can be altered with carefully sited, improved water supplies, with grazing control, and by the skilful use of burning patterns. Animal and plant populations normally produce surpluses which can be harvested with no damage to the basic breeding stock. The control of predators and disease organisms, which normally harvest such surpluses and contribute to the establishment of a habitat's carrying capacity, may considerably affect productivity. Healthy animal populations preclude or reduce the risk of epidemics.

The understanding and correct use of such tools, through ecological research, are essential to the management of wild areas and the enhanced quantitative or qualitative contribution that each can make to man's welfare.

The important factor is the land and its optimum treatment for the specific use to which it is put. Without land, nothing can live; and in degraded areas of which there are such extensive tracts in Africa, wild animals can keep the land in production whilst giving it time to rest and recover, provided there has been opportunity for research into the tools of management.

Discussion Leader:

F. Bourlière. Faculty of Medicine, Paris, France.

Rapporteurs:

P. Hill. IUCN ASP III Consultant J. Verschuren. Biologist, Institut des Parcs Nationaux du Congo.

Background Papers:

The Survey and Assessment of Wild Animals and Their Habitat in Tanganyika, H. Lamprey. Game Division, Tanganyika.

Survey and Assessment of Resources in Wild Areas, T. Riney. National Museums S. Rhodesia.

Comparison of the Efficiency of Wild Animals and Domestic Livestock in Utilization of E. African Rangelands, L. M. Talbot. Wildlife Research Project, Kenya.

Ecological Research as a Basis for Management, K. Curry-Lindahl. Nordiska Museet et Skansen, Sweden.

Ecological Research as a Basis for Wildlife Management in Africa, G. A. Petrides. Michigan State University, U.S.A.

Ecological Research as a Basis for Management, J. J. van Rensburg. Dept. of Agric, Tanganyika.

Precis of the papers presented at the Conference of Land Management Problems in Areas Containing Game—Lake Manyara—Tanganyika, H. C. Pereira. ARCRN, S. Rhodesia.

4. CONSERVATION AND DEVELOPMENT

The future of human existence depends on the natural environment, of which man is only a part.

K. Curry-Lindahl

Planning the Management of Wild Areas

Habitat, although self-perpetuating, is subject to change—whether this be natural or artificially induced. The previous chapter has discussed means of causing and assessing such modifications with definite objectives in view.

From this concept of perpetual change it follows that "preservation" of an area by excluding outside interference will not result in its retaining its *status quo*; and the application of active management is necessary in order to stop changes or guide them in a way which is considered beneficial, once some clear objectives are set. This does not mean that integral protection by exclusion of all outside interference is unimportant, however. The absence of human intervention is a measurable standard, whereas its presence may lead to a range of intensities and consequences