18th General Assembly

Workshop Report

POPULATION AND RESOURCES

18th Session of the General Assembly of
IUCN - The World Conservation Union
Perth, Australia
28 November-5 December 1990

WORKSHOP REPORT ON HUMAN POPULATION DYNAMICS AND RESOURCE DEMAND

IUCN - THE WORLD CONSERVATION UNION

Founded in 1948, IUCN - the World Conservation Union - is a membership organisation comprising governments, non-governmental organisations (NGOs), research institutions, and conservation agencies in over 100 countries. The Union's mission is to provide leadership and promote a common approach for the world conservation movement in order to safeguard the integrity and diversity of the natural world, and to ensure that human use of natural resources is appropriate, sustainable and equitable.

Several thousand scientists and experts from all continents form part of a network supporting the work of its Commissions: threatened species, protected areas, ecology, environmental strategy and planning, environmental law, and education and communication. Its thematic programmes include forest conservation, wetlands, marine ecosystems, plants, the Sahel, Antarctica, population and natural resources, and Eastern Europe. The Union's work is also supported by 12 regional and country offices located principally in developing countries.

The Population and Natural Resources Programme

The IUCN Population and Natural Resources Programme was initiated in 1987. Significant progress has already been made in introducing precise information on population size, growth, distribution, movement and structure into a wide selection of activities carried out by IUCN's Commissions and theme Programmes (Wetlands, Forests, Arid Lands, Marine and Coastal Areas). In addition, significant contributions have been made to IUCN initiatives in the wise use of wildlife, policy studies related to global change, preparations for the IV World Parks Congress, and to IUCN Field Operations in the Sahel, West Africa, Central America, and in some Asian countries.

The Population Programme attempts to assess, at grass-roots level, which conservation activities have a potential of being sustainable in the long run. Its major source of information comes from the analysis, through on-site case studies, of field projects addressing various aspects of conservation or sustainable use of particular natural environments. To date, case studies have been carried out in Burkina Faso, Cape Verde, Congo, The Gambia, Kenya, Madagascar, Mali, Brazil, Costa Rica, Honduras, Nepal, Pakistan and Thailand. Additional case studies are in preparation in Brazil and Senegal.

Experiments with the introduction of relevant demographic variables in National Conservation Strategies have been carried out in Costa Rica, Ghana, Morocco and Pakistan. Findings are reported in two "guidelines" documents; one for policy makers and one for project implementers. Presently the Programme has a worldwide multidisciplinary network of advisors, organised in five different Task Forces, working on the following themes: 1) Population-driven ecological limits to improvements in the quality of life; 2) Interdependecies between human populations and other species; 3) Relationships between average family size and average per capita level of resource consumption; 4) Urbanisation and natural resource management; and 5) Family health and natural resource management.

The Population and Natural Resources Programme is now a component of the IUCN Social Sciences Division, an umbrella structure for actual and potential IUCN activities related to the human aspects of conservation.

IUCN - THE WORLD CONSERVATION UNION
18th GENERAL ASSEMBLY
PERTH, AUSTRALIA

WORKSHOP REPORT ON HUMAN POPULATION DYNAMICS AND RESOURCE DEMAND

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30 November – 1 December 1990

Social Sciences Division

The Population and Natural Resources Programme

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List of Acronyms

(in alphabetical order)

ADC	Asociación Demográfica Costarricense
AIDAB	Australian International Development Assistance Bureau
CBR	Crude Birth Rate
CDR	Crude Death Rate
DAC	Development Assistance Committee (of OECD)
FAO	Food and Agriculture Organization of the United Nations
IPPF	International Planned Parenthood Federation
IUCN	The World Conservation Union
LDC	Less Developed Countries
MDC	More Developed Countries
NCS	National Conservation Strategy
NGO	Non-governmental Organization
OECD	Organization for Economic Cooperation and Development
PPFK	Planned Parenthood Federation of Korea
SIDA	Swedish International Development Authority
TFG	The Futures Group
UNCED	United Nations Conference on Environment and Development
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
USAID	U.S. Agency for International Development
WWF	World Wide Fund for Nature

(Note: As a result of the General Assembly deliberations, the new version of the World Conservation Strategy previously entitled *Caring for the World,* has been officially changed to *Caring for the Earth: A Strategy for Sustainable Living.)*

PREFACE

The 18th General Assembly of IUCN - the World Conservation Union, took place in Perth, Australia, from 28 November to 5 December 1990. In addition to plenary sessions and special presentations, it featured 12 Workshops on a variety of conservation themes which ran concurrently on 30 November and 1 December.

The Workshop on Human Population Dynamics and Resource Demand was the second to be held on this theme, the first having taken place at the 17th General Assembly in Costa Rica in 1988. As will be seen, it represents a remarkable advance in the understanding of population-natural resources interactions and considerably widens the growing circle of experts who are contributing to this new awareness and helping to put IUCN in the forefront on this critical issue.

Workshop speakers, panelists and participants had many opportunities to interact with other facets of the Assembly and many were also there as representatives of IUCN member organizations. In addition, the Population and Natural Resources Programme of IUCN and its network were invited to make contributions to several other workshops:

- The World Conservation Strategy for the 1990s
- Designing and Implementing the Biodiversity Conservation Strategy
- The Environmental Implications of Global Change
- Realistic Strategies for Tropical Forests
- Sustainable Wildlife Utilization
- Conservation and Sustainable Development in the Sahel and other Arid Regions.

These contributions took the form of analyses of the demographic characteristics of the ecosystems under discussion, raising questions about the relationship of human populations to the conservation goals of the workshops. These papers are available on request, together with all other invited papers for the Workshop on Human Population Dynamics and Resource Demand. A full list of titles will be found in Appendix VII. Oral presentations and contributions to the discussions are summarized in the present report.

The present report describes only the Workshop on Human Population Dynamics and Resource Demand and does not include the numerous references to population issues which were made in plenary speeches and in relation to other items on the General Assembly agenda. The full report of the General Assembly is available as Proceedings of the 18th IUCN General Assembly.

The production of this report has been made possible through a generous grant from the Australian International Development Assistance Bureau (AIDAB). The AIDAB grant also contributed towards the production of a special issue of *Earthwatch* (No. 41, June 1991), the environment magazine published jointly by IUCN, UNFPA and IPPF, which reported on the Workshop and on other important contributions to the subject made in the course of the General Assembly itself. Copies are available on request.

The work of the Population and Natural Resources Programme has been made possible through the financial support of the Swedish International Development Authority, the Andrew W. Mellon Foundation, the Dutch Government and the United Nations Population Fund (UNFPA).

INTRODUCTION
IUCN GENERAL ASSEMBLY WORKSHOP ON HUMAN POPULATION DYNAMICS AND RESOURCE DEMAND

Perth, Australia
30 November - 1 December 1990

The Workshop was formally opened by Dr Pietronella van den Oever, Head of IUCN's Social Sciences Division. She introduced the chairperson, Dr Julia Henderson.

Dr Julia Henderson served for many years in the United Nations where she rose to the rank of Associate Commissioner for Technical Cooperation. She was Secretary–General of the International Planned Parenthood Federation in London for seven years. More recently she has travelled extensively in Asia, Africa and Latin America on population assessment missions for both IPPF and the United Nations Population Fund (UNFPA). She was Chairman of the IUCN Workshop on Population and Sustainable Use of Natural Resources held in Gland in 1989. In 1991, Dr Henderson received the United Nations Population Award.

Welcoming participants, Dr Henderson said she had now been involved with IUCN's Population and Natural Resources Programme for more than a year. She gave a brief summary of the "warm-up sessions" held on 26 and 27 November, prior to the General Assembly. For Day One she highlighted the work of the five Task Forces, under the headings: Population-driven natural and ecological limits to the quality of life; establishing a balance between humans and other species; natural resource management and family health; relationships between family size and resource use, and urbanization and natural resource management. The Task Forces examined cross-linkages between their particular subject matter and the various IUCN Programmes and Commissions, such as the Forestry, Wetlands, Marine and Sustainable Use of Wildlife Programmes and the Commissions on: Ecology, Environmental Law, Environmental Strategy and Planning, Species Survival, Education, and National Parks and Protected Areas.

She described the second day as a first attempt to see what contributions the population community could make to the implementation of the new world conservation strategy *Caring for the Earth.* Dr David Munro had given participants an overview of the development of the document and its significance for IUCN and for National Conservation Strategies. Dr Henderson emphasized that the meeting had not been concerned only with the population section of the document but also with how the population community could lend its experience in population policy-making and programme development to the implementation of the strategy as a whole. Another important contribution to the day had been a presentation by Mr Ayub Qutub on the process of formulating Pakistan's National Conservation Strategy, and yet another presentation by Ms Dounia Loudiyi had provided information on the field testing of a Guidebook on Population Resources and Development. The pre-Assembly workshops had set the stage for the important discussions that lay ahead over the next two days.

Minor changes to the agenda had been necessary because of the unavoidable absence of Professor George Benneh, of Ghana, who was to have addressed the subject of The Urban Dilemma. Comments would also be welcome on the draft resolution distributed with the agenda. The two sponsors - the Asociación DemográTica Costarricense (ADC) and the National Audubon Society of USA - were represented at the workshop and would be responsible for any final decisions on any proposed amendments.

Dr Henderson described the workshop as a unique opportunity to learn from the experts and to come closer to understanding the very complex relationships between population and all the fields in which IUCN works. Everyone interested in population and environment was happy to see the growing concern within IUCN since the issues were first raised in 1981. This was clear from the many remarks made in the General Assembly, not only by the leaders of the Union but by political leaders in Australia and members of the scientific community, all of whom welcomed the broadening of IUCN's concerns to encompass the population factors related to the environment. *Caring for the Earth* confirmed this trend. The growing network of people involved in the Population and Natural Resources Programme showed that there was now more substance to the work of IUCN in this field. Some people still feel a little uncertain about what this means for IUCN - is

it an operating agency in this area? There seemed to be general agreement that it is not; that IUCN should do the things that it does best for the conservation of nature. Its interest is in the *linkages* between population and natural resource use and management. It is a purpose of the present workshop to try to understand the complexities of these relationships and the roles of the various organizations in the population and environment fields.

CHAPTER ONE

The Ambiguities of Sustainable Development

Introducing Dr Pietronella van den Oever, Dr Henderson drew attention to the paper on *Population and Natural Resources Interactions: Issues for the 1990s,* distributed to all participants with the agenda.

Population and Natural Resources Interactions in Coming Decades by Dr Pietronella van den Oever

Dr Pietronella van den Oever is a Dutch citizen. She has a multidisciplinary background, with a specific focus on global development issues. She is particularly interested in major development and population issues in the developing countries, and their relationships with patterns of development in the industrialized countries. She holds a Doctorate in Demography and Development Economics from the University of Southern California where she studied with Kingsley Davis, and a Master's Degree in Agriculture and Rural Development from Cornell University. She worked for many years for the Agricultural Extension and the Women in Agriculture Divisions of the UN Food and Agriculture Organization in field projects in Mali, Benin, Zaïre, Burundi and Burkina Faso. Currently she is the Director of the Social Sciences Division at The World Conservation Union in Gland, Switzerland.

In her paper, distributed in advance of the General Assembly, Dr van den Oever stated that conservation of nature in its present state is no longer an option; acceptable limits of resource depletion and a minimized rate of decrease of the globe's biological diversity should be the basis of policies and programmes. Even if the rate of population growth declines, population increase in absolute numbers will be enormous, bringing increasingly rapid alterations to the natural resource base of the earth.

Five interacting variables, which vary widely from region to region, must be taken into account: 1) the absolute number of people using the resources; 2) the level of the local population's resource consumption; 3) the type of practices used to harvest or protect resources; 4) the amount of export of local natural resources; 5) the resilience of nature itself.

She postulated that the combined effect of population/natural resources interactions would manifest itself as follows:

a) continued population growth will result in an increasingly large direct population pressure on nature, and threatens to increase the rate of loss of biological diversity;

b) continued population growth will contribute to massive population movements in coming decades, thereby increasing competition for, and conflicts over, natural resources;

c) in the still overwhelmingly agrarian countries, poverty-related inappropriate use of natural resources will considerably increase;

d) increasingly rapid urbanization leads to an increased rate of resource depletion in and around cities and to increasing pressure on natural resources in the "hinterland';

e) the decrease of the average family size in the middle-income countries is accompanied by a large per capita increase in demand for natural resources;

f) differences in the age structure of the industrial countries and the developing nations create a global imbalance in demand and supply of natural resources.

Dr van den Oever suggested that policy responses call for a combination of sound theory and practical experience. Intensive efforts are needed to raise awareness at all levels about the causes and consequences of population, environment and development interactions. There is a need for an interdisciplinary approach and for realistic methodologies to improve the people-resource balance. The deployment of very significant human and material resources is called for, together with interdisciplinary partnerships and an increase in

global unity through international agreement and cooperation at a new level. A new model of economic development is needed which incorporates resource consumption rather than simply demographic variables.

As things stand now, there seem to be five major obstacles to dealing with population and environment in an integrated manner:

1) The goals of individual families are often in direct contradiction to the goals of the political leadership and the wider community and society.

2) Population illiteracy is widespread among conservationists and the development assistance community.

3) There is a significant time lag between, on the one hand, the root causes of population growth and other demographic processes, and, on the other hand, the actual manifestation of the consequences.

4) Leaders tend to shy away from dealing with demographic issues in a scientific and practical way because the subject is shrouded in emotion.

5) Governments, donor agencies and international bureaucracies are afraid to experiment with innovative methodologies.

Some Complexities of Sustainability

Dr van den Oever then developed her thesis further by suggesting that there were serious ambiguities standing in the way of a clear understanding of population/natural resources interactions. The first of these is the coupling of population growth and resource demand. She quoted language used in the first World Conservation Strategy adopted in 1980 and pointed out that human population growth is clearly a demographic phenomenon but a high level of resource consumption is not.

But, as a slight improvement over the dichotomous distinction, we can divide the countries of the world into three categories. Firstly, there is a group of countries, such as those in Europe and North America and including Australia and Japan, with low, zero or negative population growth, with extremely high, but more and more stable or slightly decreasing levels of resource consumption and an effort to use environmentally-friendly technologies. The second group includes Indonesia, Brazil, Korea and Mexico, with rapidly declining average family size, increasing urbanization and improvements in the quality of life and an increasing rate of resource consumption per capita. These countries are in a "double bind"; their populations are still growing because of demographic momentum while total resource consumption increases very rapidly. In the third group, the rate of population growth remains high and the average level of resource consumption remains low. "Population people', although well equipped to deal with the analysis of causes and consequences of population growth, can only deal to a very limited extent with problems of high resource consumption. It would be wise, therefore, to dissociate the two subjects and identify the proper policies and action plans related to each one in order to avoid inertia in either sector.

Very often, countries are divided into two categories: the "haves" and the "have nots". In reality, this division cannot be made. Countries could be plotted along upwards or downwards lines.

The second ambiguity is the confusion between decreasing the rate of population growth and "stopping" population growth completely. In many cases the term "stable population" is mistakenly believed to indicate that the population has ceased to increase after replacement level fertility has been reached. However a stable population continues to grow until, after several generations of the two-child family, it becomes stationary.

Dr van den Oever plotted two hypothetical curves representing population growth and density in relation to a given natural resource to illustrate the importance of adequate policy measures to anticipate what might happen to the balance between them. The ultimate volume of a stationary population will depend on how soon replacement level fertility is reached and it is imperative to anticipate what could happen if population growth remains unchecked. It is evident, therefore, that it would be good conservation policy to have an efficient population policy as well.

Finally, she drew attention to the difficulty of matching demographic data with data on natural resources. While much is known about human populations, no similar data sets exist for any populations of trees, plants

or animals. Even where scattered sample surveys have produced limited information it is difficult to match this with demographic data.

Population and Natural Resources by Mr James N. Ypsilantis

James N. Ypsilantis has a multidisciplinary background, with an emphasis on demography and social sciences as well as statistics. He has worked with the United Nations, The Futures Group (TFG) on USAID-funded Population and Development projects, as well as the Social Sciences Division of IUCN. He has developed computer-based presentation models on Population and the Environment for the world, Central America and the Sahel, as well as an interactive model relating demographic trends and environmental change in Madagascar. This last model is currently being modified by TFG for use in the Philippines. His international experience includes six years on projects in Africa, Asia, Central America and the Caribbean, with a concentration in Madagascar and Costa Rica, as well as five years working at United Nations headquarters both in Switzerland and North America.

James Ypsilantis, using United Nations and Population Reference Bureau data and estimates, provided a demographic backdrop for the rest of the workshop. Using a computer-generated presentation, Mr Ypsilantis described historical trends, then examined some of the characteristics of the world's current population, before looking at demographic projections to the year 2025.

The first graph presented the world's estimated and projected population from the year 1400 to 2100. These data illustrate the rapid growth of world population over the past and in coming decades. The rate of growth of the world's population peaked in the late 1960s. In absolute terms, however, the number of people added to the world's population every year is still growing. This first graph showed the breakdown for More Developed Countries (MDC) and Less Developed Countries (LDC), showing that most of the world population's rapid growth is due to increases in the population of LDC.

The following graphs showed crude birth rates (CBR) and crude death rates (CDR) for LDC and MDC from 1800 to 1980. The difference between these two rates corresponds to the natural rate of increases of the population. In MDC, the CBR and CDR fell gradually and essentially in tandem over close to 200 years, resulting in comparatively slow growth rates. In contrast, the CDR of LDC fell rapidly starting after World War II (mainly due to health initiatives) while the CBR remained high in these countries until the 1970s. As a result, the LDC population started growing at faster rates than were experienced in MDC.

The MDC population growth rate was 1.3% over the 1950-1955 period, and has been steadily decreasing since then, reaching 0.6% in 1990. In contrast, the 1950-1955 population growth rate of LDC stood at 2.1%, peaked at 2.5% in the late 1960s, stood at 2.2% in 1990 and will still reach between 0.7% and 1.6% in 2020-2025. Mr Ypsilantis suggested that the rapid rates of change in LDC population, especially when combined with poverty and low levels of technology, is a cause for concern: rapid population growth tends to be a more significant factor in environmental degradation than absolute population levels or densities, especially when population growth was more rapid than economic growth.

The next graph depicted the distribution by age of MDC and LDC. LDC's populations are characterized by their youth: in 1990, 13% of the population was under five years old and 36% of the population was under age 15. In MDC, 7% of the population was under five years old and 21% was under age 15 in 1990.

In LDC, the financial burden on each worker for their dependents' health, education, clothing, food, etc., constitutes an economic constraint to household-level investments in new technologies needed to meet the demands of the increasing numbers of people. The comparatively large percentage of the population under five years old is also an obstacle to women's participation in the paid labour-force and so to the improvement of the status of women.

Lastly, the pyramidal shape of the distribution by age of LDC population means that every year, for the coming 20 years (and most likely for quite some time afterwards), the pool of population in the prime years for having children would be increasing. This leads to a phenomenon known as "demographic momentum": even if fertility fell from the 1985-1990 LDC rate of 4.2 children per woman to 2.1 children (the so-called "replacement level") overnight, LDC population would still continue to increase for at least twenty years. Population growth was thus a given for LDC, the only question being the rate at which it would grow.

The following sequence of graphs presented data on infant mortality, fertility and life expectancies in the world's major geographical regions. These were used to describe the assumptions underlying the United Nations' three demographic projections to the year 2025.

As suggested by the data on mortality and fertility by region, most of the growth in world population would occur in LDC. Under the "medium variant" (or most likely projection) world population would pass from 5.3 billion in 1990, of which 1.2 were in MDC, to 8.5 billion in 2025, of which 1.4 billion would be in MDC. LDC population was thus expected to nearly double, while MDC population grew by only 15%.

The "high" and "low" variants indicate the range within which demographers were confident population would grow. The low variant indicated world population would grow to at least 7.6 billion in 2025, of which 6.3 billion would be in LDC, while under the high growth assumption the world population would reach 9.4 billion by 2025, of which 7.9 billion would be in LDC.

The graphs clearly demonstrated that the world population is expected to grow substantially over the next 35 years. The difference between the high and low variants is significant: under the high variant there would be more people in LDC alone by 2025 than there would be in the whole world at that time under the low variant. The difference between the high and low variants was of over 1.8 billion, close to the total world population after World War II!

The final sequence of graphs depicted the proportion of world population living in urban areas. In 1950,29% of the world's total population of 2.5 billion lived in urban areas. In 1990 that percentage had reached 43% and would reach (under all projections) 61% in 2025. In absolute terms, urban population would pass from 2.3 billion in 1990 to 5.1 billion - just under the 1990 total world population - in 2025 under the medium variant.

In LDC, the per cent urban population had doubled from 17% in 1950 (total LDC population was then 1.7 billion) to 34% in 1990, and was expected to reach 57% in 2025. In absolute terms, this meant that the urban population of LDC would nearly triple from 1.4 billion in 1990 to 4.1 billion in 2025 under the medium variant!

Mr Ypsilantis noted that the growth in urban populations has two distinct causes. While migration from rural areas had attracted most of the spotlight in the past, an increasing body of data suggested that over half of the growth in LDC urban populations is in fact due to the natural growth of urban populations. The age structure of urban populations is such that a comparatively large percentage of the population in urban areas is in the prime years for child-bearing. Urban populations also have better access to health care and education (thus increasing life expectancy).

The rapid increase in urban population will have a number of environmental impacts. These range from the mining of water and forestry resources, pollution issues, the prevalence and environmental impact of "informal" sector activities, urban encroachment on agricultural land and changes in agricultural production in peri-urban areas as well as the hinterlands.

Mr Ypsilantis closed his presentation by concluding that these large changes in the world population will • present significant challenges to policy-makers in coming decades. The costs associated with the health care, education, job-creation and to generally arrive at a better life for this growing population will be large. Simultaneously, the food and water, energy, clothing and shelter needs for the added number of people will significantly increase the demand for natural resources and could jeopardize the prospects for sustainable development.

The links between population and natural resources were complex, with both direct and indirect causal relationships. Policies and projects which addressed themselves to the sustainable use of natural resources had to take these relationships into consideration.

Demographic Pressures on Natural Resources in Latin America by Professor Richard E. Bilsborrow

Professor Richard E. Bilsborrow is Research Professor and Fellow at the Carolina Population Center, and teaches demographic techniques and interrelationships between population, development and the environment in the Departments of Biostatistics, Ecology and City and Regional Planning, all at the University of North Carolina at Chapel Hill. He has worked extensively in developing countries, especially in Latin America, designing and analyzing household and community surveys on demographic and related socio-economic behaviour. More recently this has focussed on linkages between demographic processes, rural development and environmental degradation. He is a founding member of the new Center for World Environment and Sustainable Development formed by the universities of North Carolina, Duke and North Carolina State; he is the U.S. member of the Committee on Population and the Environment of the International Union for the Scientific Study of Population.

Professor Bilsborrow began his presentation by informing the workshop that a Center for World Environment and Development was being formed at Research Triangle, Chapel Hill. Funding and links with institutions in developing countries were being sought.

The focus of the presentation was on the inter-relationships between accelerating environmental deterioration, changes in land use and agricultural production and population growth and redistribution. Contrary to popular belief, the pace of environmental degradation in Latin America may be the highest in the world. The rate of decline in fertility, which was rapid in the 1970s, has slowed considerably since 1980, with total fertility rates remaining generally above 3.0 even in the countries which experienced the largest declines. The level of urbanization is as high as in the most advanced countries and much higher than in Africa and Asia.

Levels of arable and permanently cropped land in Latin American countries are rising with the growth of population and the extension of the agricultural frontier. Land shortages are already being experienced in Mexico, most of Central America and the Caribbean, and to a lesser degree in Colombia, Ecuador and Venezuela. The amount of agricultural land per worker has decreased in these countries and most others, but increased in a few countries where agricultural land substantially increased, in some cases more than the rural population grew. (Brazil, Bolivia)

Professor Bilsborrow presented data on deforestation, soil erosion and technological change in agriculture (extent of increase in irrigation and fertilizer use). The average rate of deforestation for the region is estimated for the 1980s at 1.9 per cent a year, by far the greatest in the developing world and apparently higher in countries with high levels of population density. Deforestation is also occurring in parts of the region because of population growth, agricultural expansion, increased irrigation, overuse of scarce surface water, sinking of wells and depletion of groundwater aquifers.

Although data are sparse, soil erosion also appears to be widespread, with siltation of major river basins believed to be related to the density of human habitation and deforestation in the upper watershed.

Professor Bilsborrow discussed some conceptual issues, finding that, for instance, the typical rural household is likely to engage in economic responses to a larger family size before demographic responses, viz: reducing leisure, increasing work effort, changing technologies and, when these options are exhausted, clearing new land. Changes in land use and the environment can be the consequences of other phenomena such as economic growth and structural changes but population growth also creates pressures for such changes. Rising fuelwood demand leads to deforestation; rising food demand leads to land extensification, primarily at the expense of forests, leading to lower water retention and downstream flooding.

On the supply side, population growth increases the number of young people coming onto the labour market. If their job needs cannot be met, they migrate. If they stay on the land, subdivision of family plots leads to land fragmentation making land plots smaller and less economically viable, again inducing out-migration from rural areas, particularly under conditions of concentrated land tenure.

The extent to which the environment is degraded depends on numerous factors related to soil quality and quantity, topography, climate and rainfall, as well as historical institutional and attitudinal factors. The increasing size and affluence of urban populations increases demands upon land to produce more food or

cash crop exports that, in turn, sustain the high consumption patterns of high-income countries. The dramatic increase of food imports in Latin America in the 1980s results in increasing food insecurity.

The growth and spread of cities onto fertile agricultural land is another deleterious effect on the environment associated directly with urban population growth.

Population growth directly affects fuelwood demand. Parts or all of six Latin American countries were experiencing acute scarcities of fuelwood in 1980 and 10 others were seriously depleting their stocks. Harvesting trees for fuelwood is generally more environmentally devastating than clearing land for agriculture because the land is left permanently denuded.

Land in agricultural use has increased in almost all areas of the Third World since 1950. In Latin America the expansion of the land area is said to have accounted for two-thirds of the increase in agricultural output between 1950 and 1975 but less than half since then as there are few land areas left with good soils. The hypothesis that population growth is positively related to land extensification is still untested at macro level, but it is evident that the first response to population increases in rural areas is often to increase the land area under cultivation whenever such lands exists.

The apparent abundance of arable land in Latin America must be qualified by the reality of fragile soils in lowland rain forests, inequality of land distribution and landlessness.

Professor Bilsborrow cited evidence in recent literature showing the relationship between population growth and changes in land use in different Latin American countries. Brazil has been cited as a counter example because of the vast expansion of agricultural land at the same time as the overall size of the rural population has declined since 1970. But in so far as the massive destruction of the Amazon rainforest has been deliberately promoted by government policy to relieve land pressures in the north-east and elsewhere, population factors also can be considered to contribute to land extensification and deforestation in Brazil.

Research was undertaken in Guatemala to seek a clearer understanding of the relationships between population factors, changes in land use, and degradation of the environment. Two population projections were prepared to examine their likely implications for land fragmentation, movement onto marginal lands, reduction in rural employment opportunities, increased out-migration and consequent environmental degradation.

Professor Bilsborrow concluded by drawing attention to the fact that there is not a single word about population growth in either the four-page declaration of Brasilia nor the 14-page action plan arising from the Sixth Ministerial Meeting on the Environment in Latin America and the Caribbean, held in Brazil in 1989. Nor, by implication, was there any official recognition that demographic processes have anything to do with environmental problems in the region. "This seems to be the prevailing view in the region of both governments and scholars....Stronger, more closely linked, population and environmental policies are needed."

Planning for Sustainable Development Case Study from Indonesia by Dr Riga Adiwoso Suprapto

Dr Riga Adiwoso Suprapto is an anthropologist and sociologist who is Acting Deputy Assistant Minister for Social Environment in the State Ministry of Population and Environment in Indonesia. She lectures in sociology, inter-ethnic relations and research methods at the University of Indonesia and is a part-time faculty member of the Indonesian Institute for Management Development in Jakarta. She is presently engaged in constructing policies and planning on the social aspects of environment, women and environment, the vulnerable (poor and weak) groups and inter-group relations. She is carrying out research on ethnic group diversity and business ethics in Indonesia and is a member of the board of directors of the International Association of Impact Assessments.

Dr Suprapto explained the development planning process in Indonesia, emphasizing both the economic and human dimensions. Economic growth requires a population imbued with physical strength and intellectual capacity to reach the goals of Indonesia's long-term development plans. Therefore, it is Indonesian policy to improve population quality, including the quality of life, as well as to manage natural resources and the living environment in the interests of both development and human welfare. This is consistent with the notion of

sustainable development. Efforts at sustainable development which focus only on environmental aspects are unlikely to succeed. Likewise, to isolate development from the functioning of ecosystems will have a negative effect on economic growth. Sustainable development entails a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony with efforts to maintain the functioning of natural ecosystems, both to meet human needs and preserve natural resources for future generations.

Thus the alleviation of poverty is a significant part of the strategy and has resulted in the reduction in the numbers of those living in poverty from 67.9 million 17 years ago to 30 million in 1990. This is in line with the concept of equity and includes regional planning for community development, income-generating projects and the provision of better rural infrastructures, including electricity and irrigation. The achievement of self-sufficiency in rice production, universal primary education and health, family planning and nutrition are other goals.

The notion of stability, in the context of development planning, has increasingly been taken to mean not only economic and political stability but environmental and social stability as well, including the harmonious coexistence of different social and cultural groups.

Inclusion of such notion, admittedly, is not operationally an easy task.

Dr Suprapto qualified her remarks with the warning that, although the development planning may be conceptually sound, none of these goals will be easy to achieve, especially while trying to preserve a proper balance between economic growth, population quality and sustainable use of natural resources. Other considerations apart, there is a built-in momentum for population growth because of the young age structure of the population. Even if fairly optimistic family planning targets are met over the next 20 years or so, Indonesia will still be facing the prospect of a population of from 270 to 300 million by the middle of the next century. Increasing numbers will have to be accommodated in the Outer Islands and movement from the crowded central island of Java to the periphery remains the overall feature of macro-planning.

Discussion

Mr S.P. Godrej, Vice-President of the World Wide Fund for Nature in India, asked how the Indonesian Government proposed to equate its population policy with the preservation of the natural resources of the Outer Islands.

Dr Suprapto replied that it was realistic to anticipate that in the next century Java would become one vast city. It was impossible to estimate when carrying capacity would be reached. It could not be expected that technological developments would take care of the problem. However, the productivity of the soil was lower in the Outer Islands and the rate of population increase experienced in Java could not be so easily sustained there. Studies were being carried out in Irian Jaya and development models, including ways of giving local people a greater stake in land ownership, were being examined.

Mr Monowar Hossain of the Multidisciplinary Action Research Centre in Bangladesh, asked Professor Bilsborrow about policy variables in Latin America and challenged the statement by Dr van den Oever that population would continue to grow after replacement level fertility has been reached. He said this was not necessarily consistent with demographic experience.

Professor François Ramade, of the Commission on Ecology, expressed his satisfaction with the progress that had been made to integrate population issues into IUCN's mission. He said the impact of human numbers on the biosphere is still seriously underrated. He emphasized the importance of the role of women and lamented the wastage of funds on the arms race. Even if only a few developing countries could reach their population targets sooner, rather than later, the environmental degradation would be considerably less.

Professor H.W.O. Okoth-Ogendo, Director of the Population Studies and Research Institute at the University of Nairobi, acknowledged that the relationship between population growth and resource utilization was of critical importance but involved some very complex issues. Kenya's high rate of population growth was now coming down, to about 3.5 per cent at the present time. But he said population pressure was leading to changes in land use and internal migration; out-migration was not a practical option for Kenyans because of ethnic traditions. Systems of land tenure were complex, including both communal and individual traditions, and under population pressure, traditional controls were starting to break down. Many different kinds of

change needed to be understood and the relationship to population changes had not really been looked at thoroughly. Many of the poorest people were living in the richest biomes - their needs and life styles were part of the equation.

Dr G.M. Oza, General Secretary of the International Society of Naturalists, Baroda, India, said the continuing growth of population and the profligate use by man of the planet's limited resources were causing grave apprehension. Man is dependent on the biosphere for every facet of his life-support system but he is so prominent a force in it that he is altering it considerably and often dangerously, for instance in the build-up of atmospheric carbon dioxide, damage to the stratospheric ozone shield, pollution of soil and water, loss of biodiversity and the risk of a nuclear holocaust. Nevertheless a feeling of togetherness and a willingness of politicians to look beyond the next election and become true statesmen could bring results. The biosphere is everyone's business and everyone must learn to think globally even if, inevitably, acting for the most part locally.

Mr Ahmed Bahri, Chief of the Population Division of the United Nations Economic Commission for Africa, questioned whether policies, as in Indonesia, very specifically directed, on the one hand, to land settlement, and on the other, to family planning would really work. Greater integration was probably needed. He agreed with Professor Okoth-Ogendo that economic and demographic responses were both important but suggested that a third response, a social response, which takes culture and tradition into account, may be needed, in order to influence how changes actually come about.

Mr Victor Morgan, Executive Director of the Asociación Demográfica Costarricense (ADC), agreed with Professor Bilsborrow's findings on Latin America and emphasized the urgency of awakening public and political opinion and achieving consensus on the damaging effects of population growth.

Water Scarcity - The Forgotten Dimension by Professor Malin Falkenmark

Dr Malin Falkenmark is Professor of Applied and International Hydrology at the Swedish Natural Science Research Council. She is a graduate of Uppsala University and, before taking up her present post, was Secretary and Executive Member of the Committee for Hydrology at the Council. She has had a number of important national and international assignments and has chaired and served on many expert groups concerned with water management. She has published widely on environmental problems and water resources, winning a prize in 1988 for her skill in popularizing scientific information.

Professor Falkenmark gave an elaborate and detailed explanation of why it is desperately urgent to understand that water is the single most important natural resource to support life on earth and to act quickly to manage its sources of supply, availability and use.

She expressed her dismay that so many official bodies concerned with development and agriculture, including the Brundtland Commission and FAO, had failed to address the problems of water scarcity, with all its attendant manifestations of famine, poverty, development failures and the growing pressure of human numbers. Most land uses are water-dependent and many also influence water quality and the rate of precipitation. Technological fixes to increase the biomass and thus the production of food, including the applications of fertilizers and pesticides, will not work if water is not available. FAO's carrying capacity study of selected developing countries had ignored this basic fact. Trust in engineering capabilities (dams, canals etc.) and biotechnological interventions arises from theoretical work and experiments under controlled conditions and ignores the reality of environmental characteristics like climate and hydrological regimes.

Water illiteracy is widespread. The industrial development of the North occurred in the water-abundant temperate zone, where water availability was taken for granted. Hydrological textbooks come mainly from the North and present to the arid and semi-arid tropics and sub-tropics of the world a totally false picture of water availability through precipitation, ground water aquifers and root water sources. The causes of water evaporation into the atmosphere are not understood and land use changes are made in ignorance of the damage that is being done. The supply of water is finite and will have to be shared by increasing numbers of people as population grows.

In addition to ignorance of this prospect, there is widespread mismanagement of water supplies and little effort to protect against water loss in vulnerable ecosystems.

As human numbers increase, there will be less and less water available to satisfy the demand from each person. Population growth will have to be paid for by reduced ambitions for water-dependent socio-economic development. This will have implications for the prospects of many countries to secure food self-reliance by increased agricultural production.

Professor Falkenmark concluded her presentation by urging that the new conservation strategy *Caring for the Earth* should give prominence to water as the most important life-supporting resource. She urged IUCN to take a lead in getting rid of outdated concepts and perceptions reflecting the disastrous water illiteracy typical of people in the temperate zone. A new development concept is needed that is based on the sustainable use of available natural resources. IUCN should analyze the population/resource balance in practical settings to clarify various vulnerability dimensions and look for human signals of and reactions to overstressed resources.

Discussion

Ms Kate Boyd, of the National Parks Association of New South Wales, drew attention to the impending water crisis facing Australia, the second driest continent in the world. She described how forest clearance had eliminated the natural water users (the trees) causing the ground water to rise and bring the salt up with it, leading to desertification. This is happening in some parts of the country while elsewhere, in order to meet urban demands and also for irrigation and industrial use, water consumption is continually rising. There is no public awareness of this problem.

Dr Falkenmark replied that this is a perfect example of man's interaction with natural resources. The process of salinization is slow but it would eventually penetrate the sources of drinking water. Australia is a good example of a Southern Hemisphere country using hydrology textbooks prepared for temperate zones, thus fostering water illiteracy. Australia should remedy this situation and then offer its knowledge and experience to dry developing countries.

Professor Ramade asked if any attempt had been made to calculate the carrying capacity of different countries at different levels of population, given current food production and its dependence on water availability.

Dr Falkenmark drew attention to the recent studies made by FAO of the population-supporting capacities of developing countries. But FAO was also water blind, measuring food prospects in relation to levels of technological input without taking into account the rate at which water returned to the atmosphere as a result of biomass production and how much water would be needed to raise food production.

She calculated that to raise food production to the levels possible with higher technological inputs would require about 20H per capita of water availability, whereas only 5H was likely to be available.

Professor Okoth-Ogendo pointed to the inappropriate water laws that exists in most developing countries as a result of the legal systems inherited from colonial days. The laws deal with water quality, not quantity, and presume an abundance of water. There is no realistic legislation on the management and protection of watersheds and other sources of water supply. This, as Dr Falkenmark pointed out, is yet one more example of the dominance of temperate perceptions of water availability.

Mr Ashok Khosla, of Development Alternatives in India, suggested that while the present workshop was devoted mainly to the inter-relationship of human population dynamics and resource demand, it would also be important to study the effects of resource scarcity on population. The problem went beyond family planning and contraceptives and had to do with human aspirations, how scarcity impacts on people. The answers would have important implications for government policies.

CHAPTER TWO

Implementing the Principles of *Caring for the Earth*

Dr Henderson introduced members of a Forum who had been invited to contribute their views on how the principles of *Caring for the Earth* could be implemented.

The Strategies of the UN Population Fund by Mr Katsuhide Kitatani

Mr Katsuhide Kitatani is Deputy Executive Director of the United Nations Population Fund (UNFPA). He joined the Population Fund after 28 years experience with the UN Development Programme, during which he gained wide knowledge of development problems in the Third World.

Mr Kitatani told the workshop that population is the common denominator in the socio-economic problems of environmental degradation, poverty, the energy crisis and other contemporary issues now confronting the world. Unless population growth is tackled, the world will continue to face these problems.

He stressed the importance of a holistic approach; sectoral approaches had now been shown to be counter-productive. There is a vicious circle of population growth and poverty in many developing countries, calling into question any possibility of achieving sustainability. But there can be no doubt about the importance of sound population policies as precursors of development and of the need for strong political commitment on the part of governments.

UNFPA has a strong sense of urgency and crisis. At its international meeting in the Netherlands in November 1989, the so-called Amsterdam Declaration was drawn up. This has now been adopted by the UNDP Governing Council and the UN General Assembly and also taken up by the Development Assistance Committee (DAC) of OECD. That declaration states that by the year 2000, $9 billion will have to be spent on population activities per year, half of which will have to come from the developing countries themselves, the rest provided by the international community. Some $500 million is expected to come through the World Bank.

UNFPA traditionally spends about one third of the total sum available for population activities and would expect to be handling about $ 1.3-1.4 billion by 2000. Thus, its first priority is fund raising to meet the growing demand. There has been a sudden awakening in Africa where, until a few years before, population programmes had had "an atmosphere of sleepiness". African countries are now implementing projects and programmes to the full and there is no longer any surplus of funds.

The world is awake and aware that something has to be done; UNFPA is literally screaming for additional resources. The Fund raised $210 million for 1990 but could easily have carried out programmes to a level of $300 million. Now it must gear up to raise and expend $1.3 million by the year 2000 by strengthening field activities and increasing staffing capacity significantly so as to cope with the increased demand and improve the quality of work. The Fund will continue to strengthen its advocacy role and the present expenditure of about 50 per cent of its budget on maternal and child health, including family planning, will continue. Information, education and communication must be expanded so that governments, NGOs, scholars and the media and every man and woman in the street will understand the importance of population activities. The work with governments will continue, in order to help them come up with the right policies and development programmes. The role of women must be enhanced. Healthy mothers and educated women are essential if family planning is to be effective.

Mr Kitatani described UNFPA's activities in preparation for the 1992 UN Conference on Environment and Development. The Fund has made arrangements to intensify interaction with the UNCED secretariat. A focal point is being designated to represent population concerns in the preparations for the conference and at meetings on environmental matters. An official will be designated to participate in the substantive working parties in the Preparatory Committee process. A staff member will be detailed for more than 12 months to

the UNCED secretariat in Geneva. UNFPA is compiling a list of population and development projects for the conference. Policy guidelines on population and environment interactions have already been prepared and distributed to all field offices. Workshop participants can obtain copies of the guidelines either from the field offices or the headquarters in New York. Documents and papers are being prepared for the conference, including one already available on *Safeguarding the Future,* which illustrated how population interacts with environmental concerns.

The Potential Role of the Universities Case Study from the University of Nairobi by Professor H.W.O. Okoth-Ogendo

Professor H.W.O. Okoth-Ogendo is a lawyer and Director of the Population Studies and Research Institute at the University of Nairobi. He is Director-designate of the Centre for African Family Studies. He holds degrees from the University of East Africa, Yale and Oxford and was formerly Dean of the Faculty of Law at the University of Nairobi. He has held numerous national and international posts and is at present a member of the National Council for Population and Development in Kenya and a member of the National Executive Committee of the Family Planning Association. Among his research interests, he lists legislative aspects of agrarian reform, development, environmental and population policies, urban planning and water management. He has published extensively on many of these issues.

Acknowledging that population-environment interactions were at the root of human survival and that *Caring for the Earth* is an important document for Third World countries. Professor Okoth-Ogendo questioned the assumption in the principles set forth in the strategy that the information and data exists to implement them. For example, the first principle assumes that knowledge already exists about the carrying capacity of a country and about the balance between the biomass, the technology and the rate of exploitation.

The second principle assumes that an inventory of a country's biological wealth already exists and that it is already known how the use of non-renewable resources can be coordinated with renewable resources. It cannot be assumed that all countries will have that knowledge. Workshop presentations had already shown that the necessary information is not always available.

The principles also assume that the technological capability is already in place to implement them. This could not be assumed; even in the North the techniques for managing resources are not always environmentally friendly. Institutional capacity, which includes manpower and the social context in which environmental management operates, is also assumed, although this, too, cannot be taken for granted.

In order to implement the principles of *Caring for the Earth,* therefore, efforts will have to be made to develop that threshold capacity, which must consist of accurate data, environmentally-friendly technologies and institutional capability. Universities clearly have an important role to play in helping to build this capacity, since they have been traditionally responsible for research and training and should now become more involved in advocacy.

Many universities undertake research for its own sake, but in Africa university research must be directed to the practical development problems the continent faces and the results must feed into the policy-making process. However, it is not the pursuit of new information but rather the reorganization of existing information that is needed, in order to say something new and relevant about contemporary problems. Universities must direct their research to what is known and start asking questions about what has gone wrong, in order to provide the knowledge base for successful interventions to be identified.

Dr Okoth-Ogendo emphasized that he was not just talking about population but about the whole political environment within which it is necessary to operate. Africa is an extremely unstable continent and part of that instability is the lack of the threshold conditions that would enable other processes to work. Universities should direct their attention to this problem.

The role of universities in training students in management, intellectual analysis and programme development is significant in the context of building institutional capacity. People coming out of the universities should be well grounded in the problems facing their own countries and able to develop and understand the options for solving them as new information becomes available.

He concluded his remarks by suggesting that universities should get more involved in advocacy, which academics were inclined to shun. It was particularly important that they should put their knowledge and ability at the disposal of policy-makers and those actively engaged in programme development.

Planning Through National Conservation Strategies: Case Study from Pakistan by Mr Ayub Qutub

Syed Ayub Qutub holds degrees in economic geography from Cambridge University. He specializes in national policy studies on sustainable development and macro-spatial planning. Before his appointment to the Secretariat of Pakistan's National Conservation Strategy, he served in many senior planning posts. Between 1972 and 1974 he was Secretary to the Presidents Commission on Backward areas of Pakistan. For the next 12 years he served with Pakistan Environmental and Architectural Consultants, first as manager and then General Manager of the Development Planning Unit. He has coordinated the work of the NCS Secretariat for the past five years.

Mr Qutub gave an account of the process of investigation and consultation which provided the basis on which policy decisions on the fragile environment of Pakistan could be made in the absence of a comprehensive and adequate data base which would take too long to develop. The initiative was launched by a high-level, multi-sectoral steering committee of senior civil servants and respected private citizens. Work on the National Conservation Strategy began in 1986 on the premise that unsustainability was a function of population growth and per capita consumption, resulting in demands on many economic sectors - forestries, fisheries, mining, transport, agriculture, livestock and industry - and this, in turn had impacts on a number of environmental sectors. Eighteen working groups were set up to analyze the impact of each of these sectors on other sectors. This was the first time people had been asked to think about inter-sectoral linkages, providing an alternative way of acquiring knowledge that would otherwise take years of academic research. Their method of working included provincial workshops at which attempts were made to come up with some of the remedies. The need for more education and communication was stressed, together with the need to orient research and development in the direction of conservation. Economic incentives and disincentives were considered, as was the need for more effective demographic programmes, the promotion of grassroots institutions, regional development and the involvement of women in development.

On the basis of all this work a first draft was submitted to the Steering Committee which authorized its distribution to thousands of villagers and small-town residents in order to get their reactions. The principal strategies it sets forth are the reduction of the rate of population growth through widespread promotion of family planning; increased public expenditure on health, education and the environment, and the control of urban slums by promoting the development of market towns and local industries.

In 1989 a sub-committee on population was established within the NCS Secretariat in order to bring out the linkages between population and environment issues and to incorporate the population components into the strategy. The NCS has worked on three population-environment distribution scenarios according to districts and through further division of the country into 10 agro-ecological zones. The three scenarios were circulated among 30 experts in 10 economic activities and seven environmental impact sectors. In March, 1990, the NCS Secretariat organized a population-environment workshop to help these experts communicate their concerns cross-sectorally and to come up with a holistic set of environment scenarios. The results have been integrated into the strategy.

To illustrate the gravity of the situation and the difficult policy decisions required to halt the degradation, he set out some of the evidence of Pakistan's environmental crisis. Population growth had been very rapid, rising from 17 million at the beginning of the century to 32 million at independence and to more than 110 million at the present time. Declines in the death rates had not been accompanied by any significant decline in fertility. Projections for 2018 ranged between 208 million and 287 million. The present rate of growth, at 3.2 per cent, is the 14th highest in the world for a country which is 10th largest in population size and is destined to become the eighth largest within the present century and the sixth largest by the middle of the next century. All this in a territory which would remain only the 32nd largest among world nations.

The implications of this population pressure so far are that most of the country is in bad shape, with severe soil and water loss in the Northern Province and declining biomass productivity. Arid rangelands are so

degraded that their productivity varies from 15 per cent to 40 per cent of climatic potential. In the cities, one quarter or more of the population lives in squatter settlements without access to many basic services.

Deforestation is taking place at a rate of 1 per cent a year and only 5 per cent of forest cover remains. Desertification has affected 60 per cent of the land. Soil erosion threatens over 11 million hectares and water-logging and salinity half as much again. Many species of plants, animals and fish face extinction because of the degradation to river and mangrove systems. Water pollution is widespread.

But that is only part of the picture. A more encouraging picture is the increasing productivity of the agricultural lands in the Indus basin. Food production has trebled there in the past 20 years and there are indications that the agriculture of the area is sustainable, taking into account the amount of tree plantation, the condition of the soil and the control over water-logging and salinity. Farms have become smaller as property has been divided in response to growing numbers but salinity on these smallholdings is only 1 per cent compared to 6 per cent on larger farms; thus the sustainability of small farms appeared to be assured.

Nevertheless food production in this vital part of the country will not be sustainable unless water use efficiency is increased dramatically; if not, population growth will outstrip the productive capacity of irrigated agriculture. Prevention of salinization requires continuous and increasing rates of irrigation to dilute the salts and this, in turn, causes water-logging of the soil.

Motivating People in Industrial Societies: Case Study from the National Audubon Society by Dr Patricia Waak Baldi

Dr Patricia Waak Baldi is Director ofPopulation at the National Audubon Society in the United States. Her career has involved her in the work ofother non-governmental organizations, as an Academic Administrator at Columbia University and in national government at the Office ofPopulation of the United States Agency for International Development (USAID).

Dr Baldi introduced her topic by acknowledging that until recently most people in the United States had taken the attitude that life had been generous to them and they deserved it. But now there was a growing number of non-governmental organizations very concerned about the deterioration of the natural environment and of issues of equity between developed and developing countries.

The National Audubon Society has 600,000 members in 510 chapters across the country. It has developed a wide range of institutional capabilities ranging from television programmes to ecology camps and wildlife sanctuaries. Its educational activities reach out to some 350,000 school systems. It campaigns vigorously on environmental issues and carries out a major programme on wetlands. All these activities are now becoming integrated with the Society's international and population programmes. When population and environment interactions were first integrated in the organization and met with some controversy, it was understood that the common denominator between them was concern for the quality of life of both human and other species. A world that is not healthy for wildlife is not healthy for human beings either.

The population programme began in 1979 with the focus on awareness raising and contributions to policy debates within government. In 1985 the programme was refined to give emphasis to public education to help people understand the issues, to make a commitment and then to do something about it. This is combined with public advocacy for policy changes that are needed at local, national and international levels and with coalition-building to enlarge the number of collaborating partners.

"Focus groups" were conducted three years ago, using the marketing sector technique, to find out how people understood the relationship between population and environment and what would motivate them to become actively involved. It was found that most environmental activists in the United States understood the relationship with population and were also concerned about habitat destruction and their own high resource use. They considered the population problem to be "over there" in the developing countries and believed they had no right to interfere if they were unwilling to do something about their own over-consumption.

But the most important discovery was that people felt overwhelmed by the whole issue. It was just too big. They needed to identify specific actions that might make a difference. "So we began to bring global issues into their own backyards and to give them a chance to have a say in changing policy." Meetings were set up

to give people the opportunity for dialogues with legislators; for many Congressmen it was the first time they had heard local people voice their opinions on these issues.

More recently, Audubon has joined with the National Wildlife Foundation, the Sierra Club, the Population Crisis Committee and the Planned Parenthood Federation of America, to mobilize some eight million people across the country and to train and activate them in advocacy.

Dr Baldi said another important concern was sustainable development. Audubon has a training programme to educate and involve local people in the sustainable development process. In view of the discussion on sustainability at the General Assembly, she thought it important to set out the Society's own definition:

1. All economic development must have an ecological component and be measured in terms of ecological sustainability.
2. Development projects should be focused on long-term benefits, not short-term goals.
3. The inter-locking crises - e.g. population growth and consumption patterns - must be stressed.
4. Inter-generational responsibilities must be recognized; development should meet the needs of present generations without compromising the ability of future generations to meet their own needs.

She noted the growing involvement of Audubon chapters in overseas programmes; at least a quarter of them have partnerships with NGOs in other countries. The programme to match wildhfe biologists with counter-parts in developing countries to make comparisons between similar ecosystems had sparked a much higher level of interest among the entire membership than had been anticipated.

In conclusion, Dr Baldi said she was convinced that NGOs were today out in front of governments. In any case, they were essential to whatever is decided at the policy level because a bi-level approach is essential. Policy creates the atmosphere; NGOs and local people take action. If both these levels are not going on at the same time, nothing that is done will succeed in the long run.

Discussion

Mr Nasir Dogar, of the IUCN office in Pakistan, drew attention to the tremendous problems of implementing the policies that had been set out in the Pakistan National Conservation Strategy.

It was all very well to set goals for fertility decline but at the end of the day success depended on the social structure of the society and on the responses individuals decide to make to the economic and social environment in which they live. High fertility is a logical response to poverty; young children can be sent to work and become net contributors to the family income. Many sons connect a family with other families and give it leverage over the local power structure. A policy to reduce family size, therefore, requires basic changes in the economic and social structure before it can succeed.

With regard to the second goal, to increase public expenditure on health, education and the environment, where was the money to come from? Pakistan's available revenue was already heavily committed to debt-servicing (40 per cent), military expenditure (40 per cent) and essential services. The only answer was dependence on the international community.

The third goal of controlling the growth of slum populations in urban areas by stimulating the development of market towns and local industries was extremely complex and required large-scale investment and entrepreneurial skills.

Acknowledging these difficulties, Mr Qutub said that nevertheless it was important to have these policies in place and to get political commitment to them. Once accepted by government, it was then possible to press for actions to be taken to implement them. Without such goals, nothing would be done to arrest the environmental decline.

Honorable Moses R.K. Kintu, Minister of Environment Protection in Uganda, gave strong support to the proposals for greater involvement of the universities. He called for greater efforts to involve university students in practical population and environment activities. Not only would this better prepare them for the contributions they should make to their society, but they influence parental attitudes and could also bring

government and academia closer together. He agreed that universities should be working in directions beneficial to the country, should make their research results available and get involved in the business of government. Young graduates tend to be isolated from their communities and can find themselves out of place on contemporary issues. It is important that universities prepare them for the real world.

CHAPTER THREE

Families, Communities and Sustainable Use of Natural Resources

Australian Families Facing Population and Natural Resources Interactions by Ms Dianne Proctor

Ms Dianne Proctor is Executive Director of the Family Planning Federation of Australia, to which all the State Family Planning Associations in the country belong. She was born in the United Kingdom but is now an Australian citizen, after living and working both in the United States and New Zealand. Ms Proctor has worked extensively in community service organizations and has a wide interest in issues relating to women, children and the environment.

Ms Proctor began by acknowledging that very little serious attention had so far been given in Australia to the interactions of human numbers, their life styles and their impact on the environment and the prospects for sustainability in the longer term. The fertility rate has steadily declined but the high level of net immigration has given the country the highest rate of population growth of any developed country. The total population at present is just under 17 million.

The huge land mass and low population density have traditionally suggested almost unlimited room for expansion. But the people are clustered in cities spreading out onto fertile soils in a narrow belt along the east and south-west coasts. The rest of the country is arid or semi-arid, with extremely limited capacity for agricultural expansion. About 85 per cent of the population lives in urban areas and the existing urban infrastructure is stretched near to breaking point.

Contemporary changes in family patterns are similar to those of other developed countries, with later marriages, alternative relationships, delays in the birth of the first child and a rising divorce rate. Increasing participation of women in the labour force has increased the demand for support services and the amount of income spent on consumer goods while, at the same time, a high proportion of single-parent families live in poverty. While the population is ageing, old people are increasingly self-reliant.

Resource use in Australia is characterized by a high demand for housing, cars and luxuries such as swimming pools, boats, holiday homes and large gardens, as well as inefficient heating systems. The rate of carbon dioxide emissions is one of the highest in the world, as is the per capita consumption of petrol (gasoline). Recreation and conservation activities are viewed by policy-makers as unproductive use of land, while spreading pine plantations to meet timber needs create biological deserts.

Ms Proctor concluded her frank and critical appraisal of the damaging lifestyles of Australian families by suggesting that all is not lost. People are beginning to take issue with the so-called economic rationalists on grounds that it leaves most of them poorer, a few richer, a welfare state in tatters and an environment degraded.

The Changing Structure of Korean Families by Dr Ock-Kyung Kim

Dr Ock-Kyung Kim is a demographer with the IUCN Population and Natural Resources Programme. She did her postgraduate degrees in Sociology and Public Health in Korea and USA. She also earned a higher degree in Demography in the UK. For the past 17 years, she has worked with several international organizations and the Korean government and universities.

The transformation of Korean society from predominantly agricultural in the 1950s to modern industrial has been one of the most rapid transitions experienced by any developing country. Since 1960, Korea has experienced spectacular economic growth and dramatic declines in fertility and mortality. The rate of annual population growth fell sharply from an estimated 3.1 per cent in the 1950s to 1.2 per cent during the latter half of the past decade, mainly due to the vigorous promotion of family planning and the widespread use of modern contraceptives.

Economic expansion has been accompanied by rapid urbanization and it is anticipated that by the year 2000, 80 per cent of the population will live in cities. Literacy is almost universal and many women pursue higher education. However, women's participation in the labour force has not kept pace with the rapid economic and industrial growth.

Changes in household composition include the breakdown of the traditional three-generation family unit and of the rural family because of the migration of young people to the cities. The participation of parents in the economic and social decisions of their children is gradually diminishing.

One tradition remains deeply rooted - the preference for sons - and this has been reinforced by the decline in fertility.

Effects of slower population growth on resource use include increases in the number of cars, energy consumption, housing and the supporting infrastructure, as well as in the levels of industrial waste and air pollution. With the smaller family size, the Korean population has increasingly adopted an affluent life-style which is incompatible with the sustainable use of natural resources.

Dr Kim concluded her remarks by urging immediate widespread public information and education programmes about the sustainable use of resources, combined with changes in government policies to control pollution and support sustainability. Non-governmental organizations should take the lead in mobilizing the mass media and winning over public opinion in favour of the sustainable use of natural resources.

Discussion

Korea's remarkable transformation prompted a number of questions and comments from participants. Mr Qutub described as surprising the still low participation of women in employment and asked who was the key decision-maker about family size in three-generation households. Dr Kim replied that in contemporary Korean society, characterized by modernization and education of girls, the authority of parents to take decisions on the part of their children was diminishing; young people were making up their own minds about the number of children they wanted.

Dr Johan Brisman, Assistant Director General of SIDA, questioned whether the key process in Korea's transition had not been economic growth and whether, therefore, it was possible to use family planning to create the circumstances for economic growth. Dr Kim suggested that economic growth and the decline in the rate of population growth had coincided; it was something of a chicken and egg situation.

Dr Henderson recalled that Korea had benefited enormously after World War II from Swedish assistance for social programmes, particularly health, and from American assistance towards its economic development. Mr Kunugi commented that Korea was a remarkable demonstration of a quick demographic transition. The country could be proud of its achievements and should share its experiences with other developing countries. But he added that social development could not be considered complete when the question of the status of women was still neglected. The high literacy rate after the war had helped.

Mr Morgan remarked that the Korean experience had much to offer to other countries, particularly the establishment of the Mothers' Clubs and the emphasis on voluntary choice of methods of family planning. Mr Quesada said it would be useful to go into more detail of the Korean experience, with particular reference to the development of government policy and the interface with the activities of non-governmental organizations.

Dr Kim replied that the Planned Parenthood Federation of Korea, the most important NGO in the family planning programme, had been established about a year ahead of government policy but the two sides had virtually developed along parallel courses. The fact that the government had been willing to assign total responsibility to PPFK for the information, education and communication activities had cemented the partnership. She went on to comment, however, that Korea faced major problems in the search for sustainable development due to industrial pollution and changes in lifestyle. The country had no oil, but wanted cars and needed transport. Ms Proctor sympathized with this problem, pointing out that Australian feminists actually resisted attempts to stop the use of environmentally unfriendly products. Attitudes had to be changed to gain popular acceptance of the recycling of waste products, reduction in the consumption of meat and more environmentally-friendly ways of life.

Integrating the Human Component into Endangered Species Conservation: Case Study with Lear's Macaw by Ms Ana Maria Paiva da Fonseca

Ms Ana Maria Paiva da Fonseca is General Director of the Fundaçao Biodiversitas in Belo Horizonte, Minos Gerais, Brazil. She graduated in international relations at the University of Brasilia and subsequently gained a Master's degree in international relations from the Center for Latin America Studies at the University of Florida. Her work in foreign relations and political affairs has now led her into the field of wildlife conservation and management. She co-authored this presentation with Ricardo B. Machado.

Dr da Fonseca presented project experiences to show that efforts to conserve biodiversity and protect endangered animal species were unlikely to succeed without involving local people. They had to be convinced that the protection of a species previously regarded as a competitor for scarce natural resources would in the long run improve the quality of their own lives.

She told the story of efforts to save the unique blue orindigo macaw known as Lear's Macaw (*Anodorhynchus leari)* which was first described by the French Prince Charles Bonaparte in 1856 and subsequently not seen again until 1978 in the north-eastern part of state of Bahia. Only 61 birds are reported to exist in the wild. Although their staple food is the coconut of the native licuri palm, the dwindling of the natural product forces the birds to raid subsistence com crops, making them an agricultural pest as far as the poverty-stricken local residents are concerned. The problem is exacerbated by the economic value of the licuri palm and its attraction to foraging livestock on increasingly desiccated land.

The study site covers the three municipalities of Jeremcabo, Canudos and Euclides da Cunha in north-east Bahia. The human population is extremely poor, with very high infant mortality and high illiteracy. Dry scrub forest (caatinga) is typical of the region and drought is pervasive, extending from seven to 10 months a year. The people are Roman Catholics and the church leadership is extremely powerful. Local priests were at first suspicious of the objectives of the conservation effort until an active programme to improve the standard of living of the people won their support.

Changes in agricultural practices, for instance, by reducing the frequency of burning the pastures and by planting more licuri palms, are likely to reduce the macaws' raids on the corn and thus reduce their unpopularity with the local people. Environmental education follows the philosophy of the Environmental Education Centre, created in 1990 by the Fundaçao Biodiversitas, with strong emphasis on integrating the human component in all activities.

Ms da Fonseca concluded by emphasizing the lesson learned: methods to conserve this endangered species must be adapted to the socio-economic problems faced by local people and will only succeed if the community perceives them as a way to improve its own quality of life. The phenomena that brings wildlife species to the brink of extinction are usually linked to the socio-economic conditions prevailing in the habitat rather than to intrinsic biological qualities.

Population Pressures in Mountain Areas: The Baudha-Bahunepati Family Welfare Project in Nepal by Ms Keshari Kansakar

Ms Keshari Kansakar has a Master's degree in economics from Tribhuvan University in Nepal and is at present a candidate in sociology at the University ofSouthern California, where she received her Master's in public administration in 1984, specializing inpopulation statistics. She has had research experience with the Nepal National Committee on Population and in the Population Research Laboratory of the University ofSouthern California. She carried out the field investigation of this case studyfor IUCN's Population and Natural Resources Programme.

One of the few truly integrated population and environment projects in the IUCN portfolio of case studies was described by Ms Kansakar as a successful and promising initiative that others might follow. The project began in 1975 among the Majhi population of Majhigaon in Sindhupalchwok district, located north of Kathmandu, to try to alleviate the poverty of Nepal's poorest people. It is executed by the Family Planning

Association of Nepal and has had the financial support of World Neighbors in the United States and OXFAM in the United Kingdom.

The project began as a family welfare centre but it was soon realized that permanent improvements in welfare depended on creating a sustainable environment. Activities have been directed to improving the sources of fodder for livestock in order to raise incomes and lead to other improvements in agricultural production. *Leucaena leucocephala*, known as Ipil-ipil, was extensively planted on the hilly terrain because it grows so fast and puts down deep roots which do not compete with other crops. Better breeding animals have been introduced, revenue has increased and maternal and child health has improved.

Family planning has been extensively promoted and acceptance is much higher in the project areas than the national average. There is high participation of local people, particularly women, in all project activities. Ms Kansakar said one of the striking contrasts with other projects she visited is the extent to which local people take the leadership in decision-making, forming themselves into committees to plan, implement and finance their own agreed activities. This was a strong factor in project sustainability, she suggested.

Women are being trained in forest management, nutrition, hygiene, immunization and oral rehydration therapy. Future sustainability is being sought through extensive skill-training of members of different development committees. The project collaborates with other non-governmental organizations working in the district and offers them training and advice. It helps them develop family planning activities and encourages them to refer family planning acceptors to its own clinics.

The Pro-Sierra Nevada de Santa Marta Project in Colombia by Mr Juan Mayr

Mr Juan Mayr is a photographer turned conservationist. He runs a publishing business in Bogotá and is director of the Fundación Pro-Sierra Nevada de Santa Marta, established to restore and preserve the unique ecosystem of the mountain range on Colombia's Caribbean coast.

Mr Mayr gave a dramatic description of how conservation activities were being promoted among native Indian populations on the Sierra de Santa Marta while all around were drug wars, marijuana plantations, guerrillas and army units trying to break up illegal trafficking. The human dimensions are further illustrated by the attempts by the Indians to protect their land from the peasants who are fleeing Colombia's internal conflicts. The wildlife is exemplified by the jaguars and condor eagles which are found in the mountain's dwindling forests.

The project has a strong component of health education and nutrition, in the belief that conservation must start with the health and survival of the human population. Traditional practices of the Indian tribes who originally settled in the region are being resurrected and taught to both the present-day Indians and the peasants who are arriving in their thousands in search of safety and a new life. Sections of the old stone towns have been reconstructed and water management, sanitation and other ancient technologies are being introduced. Terraces for agriculture have been restored, hostels have been built using forest materials and an indigenous building technique used by the Foundation in constructing the Alto de Mira Ecology Station.

Mr Mayr mentioned his work with the Kogi tribe of Indians, who maintain their traditions and prehispanic way of handling the environment but whose land is unfortunately very poor. Special efforts were being made to help the Kogi improve the quality of their lives. The many different residents of the mountain are in constant conflict with each other, he said, but they share a common interest in preserving their lands for the survival of all. It is this thread of unity which is the major hope of this grassroots project in a highly vulnerable ecosystem.

Lessons From IUCN Case Studies in Population and Resources by Ms Dulce Castleton

Ms Dulce Castleton is the chief field investigator of IUCN's Population and Natural Resources Programme. She graduated in education and school counselling from the Catholic University of Belo Horizonte, Minas Gerais, Brazil, and gained a Master's degree in adult education and extension development at the Virginia Pofytechnical Institute and State University. She is a specialist in rural extension work and the promotion of women's participation in development and has worked on many development projects, notably in Guinea-Bissau, Senegal and her native Brazil. Ms Castleton has recentfy carried out case studies for IUCN in Costa Rica, Brazil, The Gambia and Cape Verde.

Introducing her subject, Ms Castleton explained that IUCN's approach to case studies in the field went beyond the mere collection of data and tried to capture the understanding of local people about the inter-relationship of factors which influence the sustainable use of natural resources. It is not easy to find projects which combine population and conservation activities but those that had been studied provide invaluable knowledge and experience which could benefit other programmes.

She summarized the process by which 11 projects had been selected for in-depth investigation during 1989 - in Brazil, Burkina Faso, Congo, Costa Rica, Honduras, Kenya, Madagascar, Mali, Nepal, Pakistan and Thailand. In 1990 additional field studies were initiated in Brazil, Colombia and Ecuador and visits were made to Senegal, The Gambia, Cape Verde, Côte d'Ivoire, Ghana, Cameroon and Zambia. Fourteen developing country specialists conducted local studies.

Although lacking scientific precision and detail, the results substantiated several assumptions about the critical factors for success and in at least one case (Nepal) demonstrated the feasibility of combining environmental and family planning goals.

Firsthand insights into the practical problems encountered along the interface between people and natural resources pinpointed major stress areas which are now the subjects of recently established task forces on: 1) Population-driven natural and ecological limits to the quality of life; 2) conflicts between human populations and other species; 3) relationships between family size and resource use; 4) urbanization and natural resource management, and 5) natural resource management and family health.

The case studies have helped clarify where the Population and Natural Resources Programme fits within the broader mission of IUCN. Relations between donors and field activists have been strengthened and new partnerships have been identified.

Ms Castleton said many of the projects had also benefited from the IUCN visits. They gained local visibility and enhanced their relations with other organizations and often with government. Frank discussions about project failures had led to redesign in some cases; in others a broadening of the objectives of the project had become possible.

The field investigators had found the experience of studying population and natural resources interactions at the local level very enriching and also benefited from the acquisition of new skills in interviewing local people and assessing project experiences. International workshops at IUCN headquarters had given them a valuable opportunity to exchange results and discuss the implications of their findings.

Negative findings included lack of popular participation in decision-making, persistence of sectoral approaches to problem solving, lack of attention to the demographic characteristics of the human population and the absence of family planning services even where pressure of growing human numbers was an obvious cause of environmental degradation. There were many practical constraints on the amount of time and assistance investigators could give to the projects, although they were frequently asked to help.

For the future, project selection will be refined to close in on IUCN's specific programmes and the parts of the world where it is most active. Projects in urban areas, including some in developed countries, will be sought. Workshops, training activities and the dissemination of knowledge through publications and policy documents will continue. The five Task Forces will oversee future studies, assist in refining the methodology and establish an inventory of existing literature on population and environment interactions.

Discussion

Acknowledging that the Baudha-Bahunapati project was impressive, Mr Kunugi commented that the general family planning performance in Nepal was very poor. The government had not yet been able to identify the real problems and had failed so far to formulate an adequate response. In Brazil, the destruction of the rain forest was the main environmental disaster and should be the focus of attention. He questioned whether IUCN was getting enough benefit from its field studies and whether it was sufficiently action-oriented.

Dr van den Oever replied that not all the case studies carried out last year had been at sites where IUCN was involved. Where this was the case, projects had been redesigned to incorporate population variables. She described the work now underway to produce simple demographic tools in the form of workbooks to help project managers understand how to link population with their other goals.

Mr Bob Stensholt, Assistant Director General of the Australian International Development Aid Agency (AIDAB), commented that method and technology seemed to be emerging as more important than other issues such as gender and social impact analysis. Dr van den Oever replied that IUCN was very conscious of the importance of gender analysis and had just received a report from a consultant, Carolyn Hannan-Andersson, about how this might be incorporated into IUCN programmes.

Population Pressures in Arid Areas: The Yatenga Agro-Forestry Programme in Burkina Faso by Ms Marguerite Kaboré

Ms Marguerite Kaboré is a civil servant in the Ministry of Environment and Tourism in Burkina Faso. She holds a degree in engineering and rural development from the Institute Polytechnique Superieur in Ouagadougou, specializing in the management of water and forests. At present she is responsible for teaching and creating public awareness of people's participation in environmental management and is director of the project for improving housing and living conditions in five provinces. She has a special interest in assisting women to play their full part in planning and implementing activities which also improve their own lives.

Ms Kaboré described the geography and ecological characteristics of Burkina Faso. She pointed out that, with a population of more than 10 million in an area of 270,000 km2, it was the most densely populated country of West Africa. The environmentally degraded sub-Sahelian region of Yatenga in the northern part of the country is dry for seven or eight months of the year.

Before any serious efforts were made to reverse the trend, the traditional slash-and-bum agricultural practice, ever-shortening fallow periods and almost total energy dependence on forest products were forcing people off the degraded land to start the cycle of natural resource depletion all over again elsewhere in the region.

To redress the decline, the Government launched a strategy to halt the degradation of the soil, find ways to meet the nutritional needs of the people and create national self-reliance in energy. A number of projects had been started, some by government and others by non-governmental organizations. The IUCN case study in Yatenga concentrated on a project to change farming practices and reclaim soil fertility that began in 1979 with the help of a British non-governmental organization OXFAM and the Regional Centre for the Promotion of Rural Agriculture. After various experiments, the project introduced the technique of rock-bunding along the natural contours of the land, an innovative improvement on the local technology of trying to retain the rainwater with banks of stones. When this proved successful, other measures were taken to improve soil fertility, introduce new food and fodder crops, control foraging livestock and plant trees as windbreaks and sources of fuelwood.

Although the birth rate is high in the project villages, with married women having, on average, six children, no special effort has been made to promote family planning. Children are regarded as the gift of God and the practice of polygamy helps to space births. Lack of interest in modern means of family planning is enhanced by high infant mortality, due to malnutrition and widespread killer diseases. No family planning information and services are easily accessible to the project sites. While acknowledging this omission and explaining it in terms of local cultural attitudes, Ms Kabore said that the Government was aware of the population problems facing the country and had set up a National Population Council to formulate appropriate policies.

However, it will take some time before the local population will perceive family planning as a benefit for maternal and child health. At present it is perceived as an (undesired) family *limitation* practice.

Population Pressures on Selected Animal Species by Dr Kenneth Strom

Dr Kenneth Strom is a wildlife biologist with over fifteen years of experience managing and protecting natural resources areas in the United States. For the past eight years he has been responsible for the management of a 5400-hectare sanctuary for migratory birds within the whooping crane critical habitat on the Platte River in Nebraska. Dr Strom has been a member of the Biology Work Group for the Platte River Management Joint Study since 1985 and is an elected member of one of Nebraska's Natural Resources District Boards, he conducted a case study comparing the Platte River of Nebraska with the Indus River of Pakistan. In addition to Dr Strom's work in Pakistan, he participated in the 1989 International Crane Workshop in India and he has conducted resource education lectures in Southern Europe and Northern Africa. Dr Strom is a frequent public speaker, author and presenters of technical papers on water resources and wildlife.

Dr Strom introduced his topic by explaining that a series of case studies had been undertaken to gather the most basic information on human population growth and pressures on wildlife and particularly on the habitats used by wildlife. The intention is to create a source of information that can be used to educate and mobilize activists within the United States and in selected developing countries.

With the aid of slides, he showed how population growth in recent history seems to be overtaking the natural world and completely engulfing it. The question arises whether we are seeing the sunrise of a new day in which wildlife can walk serene in the natural world or the sunset for wildlife as humans drive them out of a world they have always shared with us and that we seem to be taking over.

Environmental impact on wildlife habitats depends not only on human numbers but on per capita consumption of resources. This connection was known; the case studies were not intended to prove it but to see how it showed up on comparative sites in the United States and other countries. Eight sites managed by Audubon in the United States were matched with eight sites in other countries with similar landscapes.

Dr Strom cited some examples. An area of marshlands in Louisiana was compared with the wetlands of the Yucatan Peninsula in Mexico. Problems of oil and gas developments in wetland systems were thus studied in two areas fairly close to each other. A site on the Rio Grande in South Texas was compared with the Biotope del Manetf in Guatemala, where environmental conditions were similar. In Guatemala the growth of tourism was having a deleterious effect on wildlife habitats but the problems in Texas were much more extreme since the whole environment had been altered by human activity. A wetlands site in North Dakota was compared with a site in the Pantanal in Brazil. The habitat of the woodstorks in the Corkscrew Swamp Sanctuary in South Florida was compared with the habitat of the flamingoes on Lake Nakuru in Kenya. Similar environmental damage from intensive agriculture, soil erosion and irrigation was found. Mangrove coastlands in Indonesia, where human numbers are high but living standards are low, were compared with similar ecosystems in South Florida, where high consumption is the main cause of human pressure.

He gave details of his personal experience in comparing the site he manages on the Platte River in Nebraska with a similar site along the Indus River in the North West Frontier Province of Pakistan. Both sites are temporary homes to migrating cranes. In the case of the Platte, they are the sandhill cranes moving from Mexico to Canada and the Arctic in the spring. In Pakistan three types of crane are at risk, including the rare Siberian crane. The Platte is a broad stream characterized by shifting sandy bottoms and fluctuating flows that maintain a largely unvegetated landscape free of trees and brush. But the development of canals has taken the water out of the river and massive dams have held the water upstream, diminishing the size of the river bed and squeezing the wildlife into ever-smaller areas. Humans have suffered too, since downstream residents are running short of drinking water. Water scarcity is a problem not only there but also throughout the whole of the western United States.

The Indus is still a very broad river but there are growing human settlements where water is being withdrawn from the river for irrigation. The growth of trees and brush, which under other conditions might be thought desirable, are indications of the changing environment for wildlife.

Would it be possible, Dr Strom asked, for people to leave room for the wildlife habitats on which their own future survival was likely also to depend?

In conclusion, Dr Strom supported Professor Falkenmark's warning that water is the resource that will be the cause of conflict at the end of this century. All the projects demonstrated the relationship of water to wildlife survival. He noted that population growth was recognized as a problem in developing countries but not in developed countries even though, in the latter, more and more people were moving into fragile areas that cannot support their numbers. He suggested that urgent future activities should include more work on the management of habitats, environmental education, involvement of local people and grassroots non-governmental organizations and continued priority for population programmes.

Discussion

The discussion turned again to the question of over-consumption. Dr van den Oever restated her position that over-consumption is not just a matter for demographers. Economic development has an enormous impact on social behaviour. The environmental damage caused by over-consumption must be addressed by sociologists and by those responsible for unfriendly technologies. Developing countries are taking the blame because of their rapid growth in human numbers but this is the wrong point of departure; consumption patterns in developed countries must be changed. The problem is a demographic one only as it relates to the age structure of the population.

Dr Baldi cautioned that nevertheless demographers had much to contribute. As long as people were at the core of the problem, demographers should lend their knowledge and expertise to the debate on all the other issues. Dr Kitatani sounded a note of urgency - the environmental situation is getting worse and worse and immediate action is needed to reverse the decline. He agreed that over-consumption is a major problem; one billion people have an insatiable demand for the earth's resources.

Dr Okoth-Ogendo commented that it is important to keep the different concepts clear, demography is a narrow discipline which can only relate population variables to other phenomena. He suggested that talk must be followed by action - the development of policies, plans and programmes. The role of law must be considered and also the upgrading and improvement of family planing programmes. There is no use pushing plans and programmes which cannot be implemented.

Mr Edmund Kerner, of Sri Lanka, emphasized the importance of the population factor and said it was a pity that UNFPA did not get greater support. He took issue with IUCN for wanting to bring market forces into everything to do with conservation, commenting that it was not possible to protect wildlife by market forces. What is needed is the greater involvement of local people, more awareness and public education and increases in the standard of living.

Dr Bahri commented that demography has become a rigid discipline and demographers are unlikely to find it easy to change their approaches to integrate more effectively with other disciplines. He added that the argument that over-consumption is the major cause of environmental degradation is unlikely to be acceptable to politicians.

Mr Kunugi questioned whether the huge resources devoted to the protection of wildlife were really justified when so many people were dying and living in poverty. The fundamental cause of environmental damage was not being addressed. He called for a better balance of priorities and used, as an example, the delay in completing a Tennesee Valley Authority project because of the need to first rescue endangered species of fish. This was a case of misplaced priorities.

These remarks brought both Dr Strom and the President of the Audubon Society, Mr Peter Berle, to their feet in a strong defence of the importance to man of the protection of wildlife habitats and the intrinsic right of all life to exist on the planet. Even without this principle, it was surely evident that protecting forests for birds, for example, also protected them for people. In addition, it had been demonstrated that interest in wildlife is a rallying point for people interested in protecting the global environment, enabling people to develop a strong desire to live in harmony with nature.

CHAPTER FOUR

Priorities and Follow-up Action on Population and Natural Resources Discussion Forum

The Chairman invited Mr Kunugi, Mr Bjorn Ganning and Mr Victor Morgan to take part in a Discussion Forum. She introduced Dr Swaminathan, President of IUCN, who had kindly agreed to lead the discussion.

Dr Swaminathan gave his unequivocal support to the long overdue integration of population issues into the work of IUCN and expressed his satisfaction with the progress that had been made. He acknowledged that the first World Conservation Strategy had mistakenly ignored population and welcomed the change of direction taken in *Caring for the Earth.*

He pointed to the inequities between developed and developing countries and the crippling problems of debt servicing, underdevelopment and trade inequities that kept so many millions of people in poverty, while more favoured nations continued to increase their share of consumption of the world's resources. The poor are the first to suffer from the environmental degradation of the planet. Without equity, there is no prospect for sustainable development. By the same token, the relationship between human beings and the natural world on which their survival depends must be harmonized. Some attempt at establishing a conservation threshold was needed.

Dr Swaminathan expressed his concern that so many contemporary events had negative implications for the future of the environment, among them economic recession in many countries and the threat of military conflict. The spread of cultural and ethnic intolerance was a warning signal.

Mr Kunugi suggested that IUCN was uniquely placed to take actions on population and natural resources interrelationships because of the composition of its membership - 60 governments, 200 governmental or parastatal agencies and more than 400 non-governmental organizations. Beyond that were the many other decision makers and change agents. The strategy *Caring for the Earth* is addressed to everyone.

The most important priority is to involve the people and give them the means to carry out surveillance over what governments are doing or failing to do. NGOs are the main actors. Now that the Cold War is over there are important new opportunities. People have the sovereign right to control actions by governments and governmental agencies. So far, however, there is no effective mechanism for involving the multi-nationals; they need to be brought into the planning process.

A second priority is environmentally-friendly technologies to reduce resource consumption. There should be a greening of technology, no matter how great the cost. Such technologies should be made available to developing countries free of charge, since one of the persistent problems was their inefficient resource use.

Thirdly, he warned that there was a danger that, with the end of the Cold War, and with attention being directed towards Eastern Europe, the wall between North and South could become thicker and higher. It should be remembered that 80 per cent of the population of the world lives in the developing countries. Their needs should come first.

Mr Ganning described the purpose and editorial coverage of *Ambio,* the scientific journal of the Royal Swedish Academy of Sciences. The journal seeks to contribute to the greater understanding of environmental issues, not only among scientists but also among decision-makers and planners and those who influence policy and political thinking.

He said he was hoping for the collaboration of IUCN in a special issue of the journal devoted to population and natural resources interactions. This issue would be a contribution to the preparations for the United Nations Conference on Environment and Development. A high-level conference is to be organized by the Academy in the Autumn of 1991; this will provide additional editorial contributions to *Ambio.*

He forecast that, as with some earlier issues of *Ambio,* the special issue on population and natural resources could become a handbook on the subject, of special value to developing countries. It could be translated into languages other than English.

Mr Victor Morgan discussed the situation in his own country, Costa Rica, where, despite a 95 per cent literacy rate, tremendous improvements in social welfare and a drop in mortality to 14 per 1000, the forests were still being burnt and the wild species were still being destroyed. "In the end, it will be our own suicide."

Although Costa Rica had achieved 70 per cent acceptance of family planning, 43 per cent of unplanned pregnancies were still not wanted. Thus much more needed to be done to improve the delivery and acceptance of family planning. A reduction in the rate of population growth would give the country time to find solutions to its environmental problems. Over-consumption was a problem and so was the disposal of waste. The goal had to be the achievement of an acceptable quality of life for all species.

Mr Morgan concluded by admitting that he had come to the IUCN General Assembly with many doubts about how the interface between population and natural resources could be brought about but he had found the discussions extremely helpful in clarifying the issues.

Thanking the panel, Dr Henderson brought the workshop to a close by offering a few summary remarks, particularly reminding participants of the important contributions they had heard on Day 1 of the meeting.

"Much of our first day was devoted to extending our knowledge base concerning the relationship of human population dynamics and natural resources. We considered Nelly's paper and the additional ideas she presented; the research findings of Professor Bilsborrow on demographic pressures on natural resources in Latin America; the experience of Indonesia in planning for sustainable development, by Dr Riga Soprapto. Professor Falkenmark shared with us her enlightening conclusions about water scarcity which succeeded in redressing our "water illiteracy".

In the Forum on Implementing the Principles of *Caring for the Earth,* we were privileged to hear four panelists representing different instrumentalities for achieving the move from declarations to action.

As a consequence of that discussion, we recommend that the work programme dealing with implementation of the principles of *Caring for the Earth* should pay attention to the importance of active partnerships with international agencies (especially UNFPA and IPPF); to the involvement of universities in policy-related research and in educating new generations in the ethics and knowledge necessary to implement those principles; and particularly to the role of NGOs, especially members of IUCN, who can play a vital role in advocacy and actual implementation.

Today we have heard about Australian and Korean families and how prosperity encourages them to increase their demands on the natural resource base. We have had case studies from Brazil, Colombia and Nepal and have heard about some of the lessons IUCN has learned from these field investigations.

Case studies should be carried on, but perhaps a greater number of studies based on current IUCN field projects could be undertaken, since they may be re-designed to include demographic concerns.

We had a lively discussion on over-consumption, with some disagreement on whether this is an appropriate part of the Population and Natural Resources Programme.

The last Forum, at which the President of the Union, Dr Swaminathan, presided and Mr Kunugi, Mr Ganning and Mr Morgan participated, dealt with fundamental issues of poverty, debt and development problems in the third world in relation to the topic of this Workshop. The participants greatly appreciated this final, broad-ranging discussion".

Dr Henderson thanked the speakers and Workshop participants for their thoughtful and wide-ranging contributions to the debate and wished Dr van den Oever every success in the implementation of her future programme.

APPENDIX I

IUCN Population and Natural Resources Programme

Pre-Assembly Meetings

The Population and Natural Resources Programme convened two "warm-up" sessions on 26 and 27 November. The meetings were intended to provide a forum for further thought on the substantive issues of population and environment interactions and to make final preparations for the present Workshop. Participants in the sessions were people who are either working in the programme or have a close relationship with it.

DAY 1

The first day was essentially an internal meeting at which the five Task Forces, established earlier this year, updated themselves and IUCN on progress made since they met in Switzerland in May. The Task Force themes are at present as follows:

1. Population-driven natural and ecological limits to the quality of life.
2. Establishing a balance between humans and other species.
3. Relationships between family size and resource use.
4. Urbanization and natural resource management.
5. Natural resource management and family health.

The five small groups were set the task of establishing, in a preliminary way, the relationship that exists between their population-related interests and the main programmes of IUCN: forests, arid lands, sustainable use of wildlife, wetlands, parks and protected areas, species survival, global change and coastal areas. After lively discussion, each team produced a catalogue of potential environmental threats induced and/or accelerated by population pressure. In many cases the interaction could not be stated in simple terms because of the complexities of ecosystems and the unpredictability of changes in human behaviour. Critical pressure points are water scarcity and mismanagement, destruction of forests and other habitats, loss of soil fertility, out-migration to overcrowded cities, loss of biodiversity and the prospect that, with growing numbers, even relatively modest efforts to protect nature from man may soon be a diminishing option.

The Task Forces will refine their work over the next few months by theoretical and practical investigation in order to bring greater precision to the understanding of these interactions. Their views will be taken into account in a series of position papers now being prepared by the Population and Natural Resources Programme. Prospects for finding solutions to the problems already identified will rest on the quality of the data that can be produced. Preliminary conclusions are as follows:

Arid lands

Growing numbers of people increase pressure on available water, thus creating acute water scarcity. Water sources become polluted, infant mortality and morbidity remain high, in spite of gains made by vaccinations and malaria prevention campaigns. Consequently fertility remains high to compensate for child losses. Conflicts arise at all levels, from inter-personal to international, over dwindling water supplies. Land degradation reduces productivity, leading ultimately to famine, unless governments step in with food imports.

Grasslands and savannah, which are important habitats for wild life, are part of the diversity of arid lands which are under threat due to population growth. Over-grazing, competition for water, soil erosion and desertification put humans in conflict with wildlife. Species become more limited and therefore more

important. Migrational herds and birds directly compete with too many people. The impact of human numbers could mean the total destruction of grasslands.

Although cities are an escape valve for people trapped in poverty-stricken, environmentally-degraded arid lands, they usually attract the most enterprising individuals and cater especially to people with few family obligations, e.g. young male adults. This is especially the case in regions where women have a strong involvement in agriculture. The age-sex structure of the hinterland therefore becomes distorted, with a large proportion of young children, women and old people. Nevertheless, rapid population growth makes rural, as well as urban, numbers swell and puts increasing pressure on resources.

Forests

Population growth increases demands for fuelwood, land clearance for agriculture and new sources of income from exports of beef products and timber. The result is destruction of forests which further penalizes the human population by disturbing the watershed function, reducing water retention, desiccating the landscape and causing downstream flooding and silting. Clear forest land rapidly loses its fertility and fails to meet the food needs of increasing numbers of people.

Deforestation has been found to be responsible for the loss of wildlife. There are many different kinds of forests and all are under demographic impact, indicated by various destructive processes such as conversion to monocultures, migration policies etc. Loss of species of wild animals and plants disrupts food, climate and potential biotechnology.

Forests surrounding cities are rapidly denuded as demands for fuelwood rise with increasing numbers of people. In the long-term, it may be possible to find substitutes for fuelwood to meet urban energy needs but in many developing countries this is not yet happening.

Parks and protected areas

Growth in human numbers will increase the demand for the release of protected land to satisfy human needs for housing and urban and industrial development as people push into available land. Thus shrinkage of size of parks and protected areas, changed priorities of financial resources intended for such conservation programmes and out-migration of indigenous people (forest dwellers) will follow.

Adjustments in the management of protected areas due to population growth include the relocation of people and the introduction of buffer zones. Attempts to meet the needs of local people may threaten certain forms of wildlife if culling of species is based on economic value. Interference with the natural system of predators can be equally dangerous in eliminating essential species from the natural chain and throwing out the delicate natural balance between species. Damage to watershed systems is increased by population pressure and denial of private ownership to people in and around such areas removes the motivation for local people to use these areas in a sustainable way in their own self-interest.

Cities need "green belts" to reduce pollution and clean the air. City dwellers' recreational needs support the demand for parks. Concentration of population in cities relieves pressure on outlying lands designated as protected areas.

Sustainable use of wildlife

Population growth sometimes leads to slash-and-burn of the natural habitats (forests, grasslands etc.) of wild species of animals and plants, to increased hunting of animals for food and saleable products and consequently to the exploitation and misuse of marginal lands.

Attempts to increase wildlife just to meet human demands for food or money may conflict with the ethical principle that every species has a right to exist in and of itself. Recognizing that wildlife can be important to indigenous people, specific wildlife which have economic value could take precedence over those species with no economic value. Biodiversity can be disrupted. Local people can be pitted against governments and businesses.

City dwellers are generally ignorant about wildlife and do not, for instance, make the connection between hunting and sustainable management of wildlife. As the number of city dwellers increases, therefore, the number of people without direct knowledge and understanding of wildlife also grows.

Wetlands

Two-thirds of the world population lives in or is dependent on coastal zones. Up-stream and down-stream damage from pollution resulting from increased human numbers is already manifest. Breeding grounds for fish and other species essential to humans and other species are being lost due to drainage of wetlands as well.

Growing cities put increasing pressure on surrounding water sources, draining wetlands and causing the eutrophication of lakes. This process is accentuated where cities are located along rivers which must also serve other parts of the country or region. It should be recognized, however, that this situation is not inevitable in all cases: proper management of city water sources can have a beneficial effect on the surrounding environment.

Global change

The most significant global change at the present time is the rapid growth of population. This, in turn, accelerates other changes due to the impact of sheer numbers - disturbance of ecoystems, disposal of more waste products etc.

Such a gloomy picture requires drastic action. The antagonism between environment and population must be overcome through dialogue between open-minded and flexible people. IUCN, with other partners, should consider how to create opportunities for such dialogues to occur, preferably in advance of the 1992 Conference on Environment and Development. The roundtable hosted by the Swedish Royal Academy of Sciences, paving the way for the special issue of *Ambio* might be appropriate.

Human-induced climate change and its consequences for vulnerable ecosystems will have serious effects on localized wild species because of the destruction of habitats, especially coastal habitats. Some wild species may not be able to move to more favourable habitats and will therefore be lost.

Rapidly growing cities are major contributors to climate change because of the emission of greenhouse gases, including CFCs, which also cause the depletion of the ozone layer. Many great and growing cities are located along the coast or along major rivers and risk inundation from possible sea rise.

Additional comments

Human population growth and demand cause environmental degradation and fragmentation.

The disappearance of species indicates a dwindling of habitat which is also detrimental to humans.

This is a worldwide phenomenon, but is particularly notable in tropical systems.

The relationship between species is not only one of conflict, but examples also exist of harmony and lessons can be learned from these.

Local "ownership" and involvement of local people are necessary to accomplish this balance.

Many illnesses are environment-related. Efforts must be made to improve living standards. The emphasis should be positive - on health and survival, not morbidity and mortality, and on improving the conditions of human life.

(Note: these listings, necessarily incomplete because of shortage of time, should be taken together with other evidence of linkages which was given by speakers and participants at the Workshop on Human Population Dynamics and Resource Demand).

DAY 2

The second day was devoted to a consideration of what the population community could contribute to the implementation of the principles of *Caring for the World: a Strategy for Sustainability.* Dr Julia Henderson, who chaired the meeting, emphasized that the population community could contribute to many different aspects of the strategy in addition to the specific chapter on population.

Dr David Munro, Director of the Strategy project, explained the process by which the document had been developed, describing the consultative process and the many comments and suggestions which had been received from organizations and individuals, often unsolicited. He outlined the structure of the document and expressed the hope that the General Assembly would approve the Strategy in principle and authorize its publication in 1991 after its own suggestions for further improvement of the document had been taken into account.

Professor Tatsuro Kunugi, of the International Christian University in Tokyo, gave a personal perspective of the prospects for and likely limitations to the involvement of international organizations and the donor community in implementing the Strategy. He described the operational and financial inputs made by the population community. Funding for population programmes had been totally inadequate, he said. He pointed to several agencies, especially the World Bank, which he felt had failed to put enough resources into social programmes, including health and family planning, and emphasized the poor performances of several OECD member countries which had not yet increased the very small percentage of overseas development aid that goes for population activities. A doubling of population assistance to at least $10 billion annually by the end of the next decade should be the goal.

Suggestions about the potential roles of non-governmental organizations were made by Ms Patricia Baldi, of the National Audubon Society, and Ms Frances Dennis, formerly with IPPF. At local, national and international levels, NGOs take up unpopular and often controversial causes and campaign vigorously for government and international policy changes. NGOs have a remarkable record of leadership on contemporary issues, using their independence to circumvent bureaucracy, empower local people and show by example what needs to be done.

The experience of developing a National Conservation Strategy for Pakistan was described by Mr Ayub Qutub, who heads the NCS Secretariat. He gave a visual presentation of the environmental problems of Pakistan, by region, ecosystem and population density. Low levels of education and literacy correlate with high fertility in vulnerable areas of the country, but the government has still not proclaimed a policy to reduce population growth. Measures to reduce population growth, including education of women, were essential.

Ms Dounia Loudiyi explained how the draft Guidebook on Population and Natural Resources, first prepared two years ago, had been field-tested in Pakistan, Ghana and Morocco and subjected to evaluation at national workshops. Experts in the different resource sectors had contributed to the evaluation. As a result, two "workbooks" addressing population-resource interactions are in preparation. The first is intended for policy makers and programme planners, while the second is addressed to implementers. The findings indicated the need to localize the planning process, develop ecological profiles of each region, and make socio-economic studies of the ways in which human populations and natural resources are interdependent.

All the presentations sparked lively discussion among the participants and many useful ideas were tabled to be taken up by the Population and Natural Resources Programme in the future. An underlying current was the necessity of broadening the agenda to include economics and ethics in order to increase public understanding and acceptance.

APPENDIX II

AGENDA
IUCN General Assembly Workshop on
Human Population Dynamics and Resource Demand
30 November - 1 December 1990

Chairperson: Dr Julia Henderson
Rapporteur: Ms Frances Dennis

DAY 1: The Ambiguities of Sustainable Development

09h00–09h30	Chairperson's Introductory Remarks: - themes, objectives, draft resolution
09h30–10h15	Population and Natural Resources: Major Issues Dr Pietronella van den Oever and Mr James N. Ypsilantis
10h15–10h45	**Coffee Break**
10h45–11h20	Demographic Pressures on Natural Resources in Latin America Prof. Richard E. Bilsborrow
11h20–12h00	Planning for Sustainable Development: Case Study from Indonesia Dr Riga Adiwoso Soprapto
12h00–12h30	Discussion
12h30–14h30	**Lunch**
14h30–15h00	Water Scarcity - The Forgotten Dimension Prof. Malin Falkenmark
15h00–16h00	Discussion
16h00–16h30	**Tea Break**
16h30–17h30	Forum and Discussion: Implementing the Principles of *Caring for the Earth* 1. The Strategies of the UN Population Fund Mr Katsuhide Kitatani 2. The Potential Role of Universities: Case Study from Kenyatta University, Kenya Prof. Okoth-Ogendo 3. Planning through National Conservation Strategies: Case Study from the Pakistan NCS Mr Ayub Qutub 4. Motivating People in Industrial Societies: Case Study from the National Audubon Society, USA Dr Patricia Baldi
17h30–17h45	Conclusions by Chairperson

DAY 2: Families, Communities and Sustainable Use of Natural Resources

09h00–09h15	Opening Remarks by Chairperson
09h15–09h45	Australian Families facing Population and Natural Resource Interaction Ms Dianne Proctor
09h45–10h15	The Changing Structure of Korean Families Dr Ock-Kyung Kim
10h15–10h30	Discussion
10h30–10h45	**Coffee Break**
10h45–11h00	Case Studies of "critical areas" of high population pressure on natural resources, leading to conflicts between human populations and other species and threatening sustainability of the balance between people and resources
11h00–11h15	Population Pressures in Tropical Forests: Protection of Biological Diversity in Brazil Ms Ana Maria Paiva da Fonseca
11hl5–11h45	Population Pressures in Mountain Areas: 1. The Baudha-Bahunepati Family Welfare Project in Nepal Ms Keshari Kansakar
11h45–12h30	2. The Pro-Sierra Nevada de Santa Marta Project in Colombia Mr Juan Mayr
12h30–13h30	**Lunch**
13h30–14h00	Lessons from IUCN Case Studies in Population and Natural Resources Ms Dulce Castleton
14h00–14h30	Population Pressures in Arid Areas: The Yatenga Agro-Forestry Programme in Burkina Faso Ms Marguerite Kaboré
14h30–15h00	Population Pressures on Selected Animal Species Dr Kenneth Strom
15h00–15h30	Discussion
15h30–16h00	**Tea Break**
16h00–17h00	Discussion Forum: Priorities and Follow-Up Action on Population and Natural Resources Leader: Dr Swaminathan Discussants: Mr Tatsuro Kunugi, Mr Bjorn Ganning, Mr Victor Morgan
17h00	Concluding Remarks by Chairperson

APPENDIX III

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APPENDIX IV

Concept Paper on Population-Environmental Linkages

by Dr Wila D. Mung'Omba

The decade of the 1990s is the time of decision for two major issues of planetary survival: Population and Environment. The linkage between these two subjects is becoming clearer as demographic and resource problems intensify, yet it remains too complex to permit generalizations about direct causal relationships.

Nonetheless, there are numerous demographic factors which must be recognized and understood in light of their impact on the environment if policy makers are to find viable solutions to environmental problems. These factors include population size and growth, socio-economic status and change, population distribution, employment patterns and health.

Population size and growth

Population size and growth have a direct bearing on environmental quality. While the global fertility rate has fallen over the last 40 years, population continues to grow faster than at any time in human history. Nonetheless, the earth's population should stabilize in the future, possibly as early as the 21st century. This stabilization will come about from continued reduction in fertility rates or through Malthusian disasters which signal a breaking point in the earth's carrying capacity.

The greater part of future global population growth, 90% over the next thirty years, will occur in developing nations. Hundreds of millions of poor people in these countries overuse natural resources on a daily basis in their struggle for survival. In Africa deforestation outstrips new tree planting 29 to 1 as the poor denude vast areas of vegetation in the search for fuel for heat and cooking. This overuse leads to ever worsening living conditions and helps to establish a cycle of poverty and resource degradation.

Socio-economic status and change

Resource demands in the industrialized world have increased with rising levels of per capita GNP, generating further environmental pressures, due to the changing socio-economic status of the population as a whole. While the advanced industrialized nations account for less than 25% of the world's population, they use 25% of its energy resources, 80% of commercial fuels and 85% of its timber. Official development aid to tropical forestry projects totals almost $1 billion annually, yet most of this money supports environmentally destructive activities: mining, logging and ranching.

Seemingly, as resource use increases, waste generation increases. The US currently produces more than 11 billion tons of solid waste annually with commercial and household trash increasing due to the American penchant for disposables. Due to our use of resources and creation of waste, the impact on the environment of a newborn American child will be 30 times that of a child bom in India, given current consumption patterns. The problems of consumption and waste become global, however, as developing countries continue to advance in terms of their socio-economic status.

Population distribution

Rapid urbanization in the Third World is severely straining the ability of governments to provide adequate housing, sanitation and other infrastructure requirements. Squatter settlements arise on marginal lands, flood-prone areas or industrial sites where environmental conditions are appalling. In many nations, governments have encouraged the exploitation of resources as a pressure-relief valve to keep a secure social climate through economic opportunity.

By 2030, some 6.4 billion people, 80% of the projected 8 billion world population (low estimate), will reside in tropical countries. Over 100 species of plant and animal life become extinct each day in these areas, mainly from loss of habitat due to human incursion.

Population distribution and land use are also problems in the industrialized world. Real estate development in the advanced industrial economies increases the pressure on delicate ecosystems, such as coastal wetlands. Severe water shortages are developing in the USA in California, Arizona, Texas and Florida as well as globally, as in the Sahelian region in Africa.

Employment patterns

Employment patterns are also intricately linked to environmental policies. In small coastal communities in the Third World, lack of alternative employment increases pressure on fishing communities to overfish their waters. Decreasing catches and increasing time necessary to obtain an adequate catch further the cycle of poverty.

Environmental action to save species of flora or fauna can have severe negative effects on local economies which are dependent on certain types of jobs. For example, communities in the Pacific Northwest dependent on the earnings of loggers are hurt by efforts to preserve mature forests and wildlife.

The majority of the people who have moved into tropical regions due to the opportunity for gainful employment are landless and must be considered in terms of alternate employment and settlement strategies. In the USA, regulations and Congressional mandates concerning automobile emissions and alternative-fuel vehicles could have dire consequences for the domestic car industry and those employed in related fields.

Health

Health, public and individual, is directly affected by the treatment of our environment. The World Health Organization estimates that hundreds of thousands of people die each year from acute pesticide poisoning. The incidence of respiratory ailments, such as asthma, and allergies is rising, especially among children and the elderly, due in large part to deteriorating air quality.

We are exposed to toxic and radioactive substances on a daily basis and contamination of drinking water is an ongoing problem. Our systems continually must adjust to various levels of water, air and noise pollution. All of these bear heavily on the cost of health care and quality of life around the world.

Deforestation and loss of agricultural land

The total forest area in developing world countries has declined by half since 1900, and is decreasing by about 11 million hectares each year, mainly because of increasing farmlands. Fuelwood scarcities in about 57 developing countries affect more than one billion people.

In many Third World countries, rural people rely on wood for 80% or more of their cooking fuel, and consumption exceeds annual sustainable supplies by huge margins; 70% in Sudan, 150% in Ethiopia, 800% in Mauritania.

The search for fuel for heat and cooking results in vast areas being denuded of vegetation. Present deforestation in Africa exceeds new tree planting by 29 to 1. This contributes to worsening living conditions, and a cycle of poverty and resource degradation. Fuelwood scarcity also forces farmers to burn about 400 million tons of animal dung a year. If this dung were used instead as fertilizer to improve soil fertility, grain production could increase by about 20 million tons a year.

The underlying reasons for deforestation in the tropics include pressures of expanding population, combined with inequalities in land tenure, rural poverty, relatively low agricultural productivity, under-investment in forestry, general ineffectiveness of state and national forestry agencies and a lack of integrated planning among forestry, agriculture, health, energy and other sectors.

Population pressure on resources usually reflects an extremely skewed distribution of resources. When farmers encroach on forests or cultivable erodible hillsides, often the pressures reflect concentration of land in large holdings. Fifty per cent of farmers are smallholders, owning, in total, less than five per cent of total cropland. Population growth further exacerbates this concentration and the resulting inequalities, pushing poorer farmers on to more marginal, less fertile lands.

By the next century, the population of Bangladesh will probably have doubled, with another doubling ahead. Already, more than one-third of the rural population is landless, and the average size of a farm holding has

decreased from 2.2 acres in 1960 to 1.3 today. More than 40% of the rural poor survive on less than 80% of the World Health Organization's minimum caloric intake requirement Real wages in agriculture have declined by 50% in the last 20 years.

Loss of agricultural land through erosion, salinization, and waterlogging means that 35% of the world's land area is at risk. It is estimated that, in the last quarter of this century, soil erosion could reduce Africa's agricultural production by 25% if conservation measures are not adopted.

In Sudan, per capita food production has declined by 13% in the past decade. Agricultural lands are deteriorating because of poor land management, and with siltation from upstream erosion. Deforestation is severe, especially around cities, contributing to increased erosion and the encroachment of sand dunes from the Libyan desert.

In Africa, the shifting cultivation traditionally practised to maintain soil fertility has begun to decline under high population densities as farmers return to the same plot every 5 to 10 years instead of waiting 20 to 25 years as they used to. With increasingly shorter fallow cycles, the land's vegetative cover decreases, and soil erosion and land degradation accelerate.

These processes at work in arid and semi-arid regions in Africa and elsewhere are destroying the productivity of an estimated 20 million hectares of land per year. The process could become even more severe as pressures on agricultural land intensify.

The problem of continued deforestation comes close to being a "true tragedy of the commons". Deforestation occurs overwhelmingly on public lands that are inadequately managed or where villages have traditional cutting rights. Since this land does not belong to any one person, tree planting is rare.

Experience shows that farmers will plant trees when returns are high, for instance with trees that provide fruit or fodder or other products in addition to fuelwood. Several programmes in India, Haiti and China have shown the success of this approach.

In the state of Gujarat in India, government subsidies for seedlings, buy-back agreements, and the establishing of tree nurseries by schools and private farmers led to many farmers shifting from cotton cultivation to eucalyptus trees. In 1975,12 million trees were planted, increasing to 100 million by 1981 and 195 million by 1983. Approximately one-third of the harvest mainly tops and thinnings - are available for fuelwood.

A five-fold increase in tree planting is required to approach a balance of demand and sustainable supply in rural areas of the developing world by the next century. Greater effort can be devoted to developing programmes that involve communities and private producers; fast-growing, high-yielding, soil-restoring, multi-purpose tree species attractive to local communities need to be promoted.

Poverty and unequal distribution of resources underly the deterioration of resources and increasing population pressures in much of the world. Economic deprivation and environmental degradation reinforce one another to form a continuous downward spiral.

In Africa, the combination of record population growth and widespread land degradation is reducing per capita grain production. There has been a drop of 20% from the peak in 1967, which has converted the region into a grain importer and raised the continent's mounting external debt. In both Africa and Latin America, food consumption per person is lower today than at the start of the decade.

In Nepal, as the population swells, farmers in highland valleys are forced to expand cultivation to steep forested hillsides. Over the past decade, forests have receded to half their original size, the daily journey of women to gather fuel and fodder has increased by more than an hour, their work day in the fields has shortened, family incomes have declined and food consumption in the region has fallen by an average of 100 calories per person. In several villages, childhood malnutrition rates and deforestation rates are highly correlated.

A long-term goal to alleviate the situation can be one of sustainable development: a broad-based development strategy that incorporates management of all assets - natural and human resources as well as financial and physical.

The human population must be stable - rates of population growth like those in this century would be unsustainable in the long run. However, the time it takes to reach stability, the size of a stable population, and how this stability is achieved are critical policy questions.

Urbanization

Between 1975 and 1985 the urban population in the Third World increased by 450 million. Rural population increased by 300 million, most of which was in China. By the year 2010 it is estimated that another 1.2 billion will be living in cities. Of an estimated 988.6 million people in Africa 42.7% will be urban. This proportion is 45% for Asia and 78.3% for Latin America.

African cities are growing at the rate of 6% per annum. Latin America is the most urbanized of the developing continents, even though it accounts for less than a quarter of the urban population in developing countries.

By the turn of the century, the Third World will have 37 cities with populations of more than five million. This expansion is primarily a consequence of both rural-urban migration and natural increase.

Decentralizing industry, and improving living conditions in small cities and rural areas can help slow down migration. However, migration now seems to be less important a factor than natural increase. For instance, in Latin America, migration ceased to be a driving force behind urbanization more than ten years ago.

Populations of most Third World cities are growing faster than the supporting infrastructural and institutional apparatus. This has resulted in mismatches and disproportions in food, energy and water supplies. Waste disposal is another major problem. The collection and reselling of solid waste often serves as a source of income for the poorest, but this waste can also be an important health hazard.

In 1975, nearly three times more rural than urban households lived in poverty. With the rapid rate of urbanization, this relationship will be reversed by the end of the century. Compared to urban populations as a whole, urban poor have larger families, lower life expectancy by years or even decades, especially for females, and much higher mortality and morbidity rates for children under five years.

Insanitary living conditions because of overcrowding compound the problem. Household, airborne and water-carried diseases adversely affect child morbidity and mortality. It is estimated that, in Latin America, at least US$50 billion would need to be spent to reach WHO standards of water and sanitation services by the year 2000.

It is estimated that a third to a half of Third World urban residents are living illegally on public or private lands. A study in 1980 in Manila found that 2 million of the 5.5 million inhabitants were living in illegal squatter settlements, and only 15% of Manila households could afford to buy or rent legal housing on the open market.

In Nairobi, 40% of the inhabitants now occupy illegal shanty towns with no piped water, sewers or drains and no lighting or access roads. It is estimated that this population will increase from one million to more than five million by early next century.

The lack of critical elements for survival of the urban poor contributes to environmental imbalances. In 1979, urban households in Pakistan consumed about 18% of the country's fuelwood, and may have accounted for as much as half of all fuelwood consumed over the past ten years.

Population - food supply - irrigation

Man began irrigating land over 2500 years ago along the Tigris, Euphrates and Nile river systems in order to increase yields and crops available to feed growing populations. By 1800, a total of 8 million hectares (a land mass the size of Austria) was irrigated world wide. By 1900 this area increased six-fold to 48 million hectares. Today, approximately 250 million hectares are irrigated globally. While this represents only 17% of all cropland globally, more than one-third of global harvests are produced on this land. China, Egypt, India, Indonesia, Israel, Japan, North and South Korea, Pakistan and Peru rely on irrigated agricultural land for more than one half of domestic food production. According to the FAO, a doubling of the world's population and increases in per capita income will triple world food demands by the middle of the next century.

The cost of irrigation is increasing as the land and water systems most easily exploited have come under irrigation. Capital costs of new systems are $1500 per hectare in China, $1500-$4000 in South and Southeast Asia, $6000 in Brazil, $10,000 in Mexico and $10-20,000 in most of Africa.

The cost of new systems is not the only pressure slowing the expansion of irrigated systems to feed burgeoning populations. Domestic and industrial uses increasingly compete with agricultural uses of water. In naturally water-scarce regions, irrigation critical to fanning accounts for 80% of consumption. Rapid growth and urbanization will increasingly compete for water resources, drawing them away from farming. For example, due to the growth of Beijing, nearby farmers stand to lose 30-40% of their current supply of water in the next decade.

Better management of water resources will solve part of the dilemma. The Metropolitan Water District of Southern California is financing water conservation in the neighbouring Imperial Irrigation District. Their investments will save 100,000 acre feet of water per year, enough water for 800,000 Californians, without taking cropland out of production.

Yearly, 3300 cubic kilometres of water (six times the annual flow of the Mississippi River) is taken from rivers, streams, underground aquifers leading to declining and contaminated aquifers, shrinking lakes and inland seas, and destruction of aquatic habitat.

Examples:

1) In the USA, water for irrigation is being pumped at rates in excess of recharge on 25% of all irrigated land.

2) The Aral Sea in the Central Asian Republics of the USSR is shrinking rapidly due to the diversion of feeder rivers to irrigation. The surface area of the sea has decreased 40% since 1960, its volume is down by two-thirds, its salinity has increased threefold and all native species of fish have disappeared, devastating the local fishing industry.

3) In the Western USA, excessive irrigation and poor drainage have been linked to death, deformities and reproductive failure in fish, birds and other wildlife. The culprits are often toxic chemicals in agricultural runoff.

Irrigation, when improperly managed also leads to problems of salinization and water-logging. Water-logging typically occurs due to unlined canals and overwatering of land which raises the water table. Root zones become water-logged, starving the plants of needed oxygen and inhibiting growth. Salinization occurs as evaporation causes a steady build-up of salt in the soil. Applying 10,000 cubic metres of water per hectare annually (average range) adds 25 tons of salt to the soil which must be flushed out. Otherwise, the steady build-up reduces yields and eventually makes the land unusable for agriculture.

Examples:

1) Currently in India, salinity reduces yields on 20 million hectares and another 7 million hectares have been abandoned.

2) In the Sahelian region of Africa, losses to water-logging and salinity remove land from use as rapidly as new land is being brought under cultivation.

3) Globally, approximately 24% of irrigated land experiences reduced yields due to salinization.

Egypt depends almost entirely on the Nile for water for irrigation, domestic and industrial needs. None of the Nile's sources, however, originate within the country's borders. Due to population increase and development, Egypt's water needs are likely to exceed reliable supply within a decade. Ethiopia controls about 80% of the headwaters of the Nile. As its population grows and develops, it is likely that more water will be diverted for use within Ethiopia which will create an even more desperate situation for Egypt.

Water Scarcity, Population Growth and Development

- Water is the basis of life. The deep involvement of water in plant, animal and human processes makes living matter vulnerable to changes in both the quantity and quality of water available to them.
- The process of socio-economic development increases the demand for water to support key sectors in the economy. Agriculture requires easy access to water to improve crop yields. Improvements in health and sanitation require increasing household water supplies. Furthermore, the accessibility of water is crucial for the growth of industry.
- Top level policy makers and development specialists tend to be dominated by people educated and trained in the temperate zone. Since water scarcity is rarely, if ever, a problem, these people are not used to thinking of water as a constraint on socio-economic activity. Development strategies will necessarily be affected.

Water scarcity: a constraint to development

- Natural forms of water scarcity include aridity and intermittant droughts. Man-induced forms include land desiccation or desertification and water stress due to high levels of water competition. When these four modes of scarcity interact with one another, the risk of complete collapse of the socio-economic structure is great.

Water scarcity through reduced rainfall interrupts the processes of the wetting of the soil while scarcity inherent in the lack of water retention prevents the recharge of aquifers and rivers. Water scarcity often reduces quality of freshwater and reduces the per capita availability of water for societal use.

- Crop failure and low yields are closely related to disruption of the supply of water to plant roots. Inadequate water supplies may also limit the length of the growing season to the degree that rain-fed agricultural production is not secure. Local famine may occur as a result.
- Overgrazing and deforestation from fuelwood harvesting exacerbate land degradation caused by water scarcity. Eventually, these factors combine in the complete desertification of the land replacing a once-productive resource with barren land.
- Population growth intensifies the competitive pressure on access to water for its multiple uses. In essence, the growth of a population lowers the potential amount of water available for societal use on a per capita basis. Reduced per capita availability of water has significant political ramifications in terms of water conflicts, for example, between access rights of upstream users and downstream users along a particular water source.
- Water management problems are of limited difficulty as long as the utilization level is below 10% of the available water. Regional problems may arise when utilization reaches from 10 to 20%. Beyond 20% large management problems arise from storage, distribution and waste issues.
- The maximum level of per capita water demand that may be supported in a region depends upon the relation of population size and the amount of water available from the water cycle. A lack of storage volume due to topographical reasons, or large losses in storage due to a hot climate will significantly reduce that level.
- Even after the technological problems of storage, distribution and waste water treatment are solved, there may still be significant administrative barriers to overcome. Coordinating the various sectors of society which compete for water resources will require significant administrative capabilities.

The situation in Africa

Fundamental development dilemmas are caused by problems related to resource management methods such as large-scale land clearing copied from countries in more temperate zones where water scarcity is rarely a serious problem. These methods are inappropriate to the region, causing deforestation and land degradation.

- In the "hunger crescent" in sub-Saharan Africa scarce rainfall has significantly reduced the growing season. Furthermore, lack of water retention after evaporation is preventing the recharge of aquifers. In other words, there has been inadequate water available to support food production and socio-economic growth.
- Sub-Saharan Africa is plagued by low agricultural yields. Population growth is such that present yields will not be sufficient to support future populations. Water supply is crucial to increased yields. In fact, high yields on a Western scale are possible only with unlimited access to soil water by the plants.
- The natural aridity of the region implies an inherent disadvantage in terms of water resources. Coupled with intermittent droughts, the picture emerges of a system under considerable stress. Desertification and water competition further aggravate the situation making livelihood security in Africa particularly vulnerable to collapse.
- As African economies grow, the importance of water for socio-economic development implies that overall per capita demand for water will be increasing. However, if population growth continues at current levels, water will not be readily available to support both the level of socio-economic development sought and the new generations of Africans.
- The development of severe water shortages in Africa also increases the potential for international conflict. Most of major rivers and the river basins in Africa pass through numerous countries. Competition between up-stream and down-stream sources will heighten.
- International tensions aside, the Congo Basin could, in the long run, provide rich resources for water transfers to water-scarce regions. Presently, though, Africa does not have unlimited access to advanced technology and coordinating capacity, much less the financing needed for large-scale water transfer projects.
- By the year 2000, 250 million Africans will live in countries characterized by water problems beyond manageable capacity, such as chronic water scarcity and water stress. This figure will rise to 1.1 billion by the year 2025, representing two-thirds of the continent's population at the time.
- By 2025, two-thirds of the continent will suffer from per capita water supplies which are only 10% to 25% of the levels needed to support irrigated agriculture in semi-arid developing countries. These levels of per capita availability of water assume 100% utilization of available capacity.
- Three major groups of countries can be distinguished as most likely to experience water scarcity problems. North African countries are already water stressed and will reach absolute water scarcity by the year 2025. Most Eastern and some southern African nations will face water stress by the year 2000. Parts of western Africa will also become water stressed by the first decade of the 21st century.

Implications and comments

- Given the water-intensive nature of irrigated agriculture and the potential level of demand for water from competing sources such as industry and society at large, policy makers will have to debate whether the present goal of self-sufficiency in food production is realistic in the long run.
- Population growth is at the heart of the problem of development in semi-arid regions. While development implies increasing demands for water for food security, health improvements, and industry, population growth reduces the potential per capita availability of water resources. Decline in per capita availability of water may lead to dramatic decreases in the quality of life.

- In the past, policy makers concerned about water scarcity have sought technology-oriented solutions to secure supplies, such as desalinization or water transferral from water rich regions. The challenge, however, is one of the proper management of available resources and not a supply-oriented approach. Successful population policies are needed to prevent water starvation and the resulting environmental out-migration from severely affected areas.
- New strategies must come from a heightened awareness of the problems caused by water scarcity, population growth and development. These strategies must include population and water resource assessments and plans for optimal use of available water and other resources.

There is a strong need for government support for family planning programmes to address the issues of population growth.

There is need for better understanding of the relationship between population and the environment. This would include further research and the involvement of both public and private sectors, particularly in support of education programmes.

APPENDIX V

18.17 Resolution on Human Population Dynamics and Resource Demand

REAFFIRMING Resolutions 16.3 on Population and the World Conservation Strategy, and Resolution 17.7 on Population, adopted at the 16th and 17th Sessions of the General Assembly;

WELCOMING the actions taken by IUCN with the support of aid agencies and private foundations, and in partnership with competent organizations in the population field, including the United Nations Population Fund and the International Planned Parenthood Federation to develop a better understanding of the complex interrelationships between population and the sustainable use and management of natural resources;

CONSIDERING that the crucial interdependence between human populations and natural resources should receive sufficient emphasis in the preparations for the 1992 United Nations Conference on Environment and Development;

ALSO CONSIDERING that progress towards stabilizing world population has been slower than expected and that in many countries population pressures, acute poverty and environmental degradation are impeding the way towards sustainable development, while in more developed countries over-consumption of resources, and in some instances population pressures, have led to local and national environmental deterioration and contributed to a rapidly deteriorating global environment;

The General Assembly of IUCN, at its 18th Session in Perth, Australia, 28 November-5 December 1990:

1. URGES member Governments, other members of IUCN, and the Director General to use their best efforts to ensure that population issues are given high priority at the 1992 United Nations Conference on Environment and Development; and that environmental issues, including human life support systems, are given equivalent prominence at the 1994 United Nations International Population Conference;

2. URGES IUCN members to take active steps towards integrating population and environmental issues by creating partnerships with competent organizations, particularly local organizations, in order to raise awareness, engage in demonstration projects and report on the experiences gained in these projects;

3. ENCOURAGES IUCN members and the IUCN Secretariat to continue to take the lead in exploring and initiating actions on the relations between:

    a. population growth and distribution, finite natural resources and attainable quality of life;

    b. human population trends and the survival of other species;

    c. family size, changes in social and cultural behaviour and technologies and patterns of resource use;

    d. natural resources management and human health, particularly the morbidity and mortality of infants and young children;

    e. over-consumption, urbanization, rural impoverishment and options for sustainable resource use and management;

    f. women in development and their role in the process of achieving environmental sustainability;

18.17 *continued*

4. REQUESTS the Director General and Secretariat, in advising governments on the formulation and implementation of National Conservation Strategies, to take all appropriate steps to ensure that the population characteristics of a country, including growth, distribution, urbanization, age-sex structure, family size, morbidity, mortality, migration and labour force structure are integrated in the planning process, and that population-related resource stress is analyzed not only from the point of view of sustainable use and management but also the quality of human life as defined in the Universal Declaration of Human Rights, and the World Health Organization's definition of health;

5. ENDORSES the proposals for the Population and Natural Resources Programme set out in paragraph Al and Annex 2 of the draft IUCN Programme 1991-1993;

6. REQUESTS the Director General, within available resources, to expand the Population and Natural Resources Programme, particularly to enable:

   a. more effective actions, including case studies, at the local level; experimentation with, and reporting on, integrated population and environmental projects at the local level; and systematic inclusion of a population dimension in all National Conservation Strategies;

   b. enlargement of the network of partners and resource persons;

   c. enhanced understanding of the relationships between the world's population and the global natural resource base, with particular attention to the size and growth of human numbers and the unequal access to and use of natural resources in different regions of the world;

   d. the encouragement of academic programmes, in collaboration with appropriate institutions over the world, to further the theoretical understanding of these issues;

   e. the development of local human resources in different countries and regions of the world through organized training programmes and workshops, as well as informal training and exchanges of experience between policy-makers and project leaders;

   f. the provision of advice and guidance to all other programmes of IUCN which need to take i account the population dimensions of their work.

18.18 Resolution on Women and Natural Resource Management

REAFFIRMING Recommendation 17/13 "Women and Environment" adopted by the General Assembly at its 17th Session;

WELCOMING the action of IUCN in introducing a programme on Women and Natural Resource Management;

CONSIDERING that women's lives, especially in developing countries, are closely linked with the state of natural resources and that women are a powerful force for ensuring natural resource conservation and sustainable development;

CONCERNED that no adequate analysis has yet been made of the division of labour between men and women and that the need to involve women and their skills and knowledge fully in decisions about managing the environment for sustainable development is still not widely recognized;

The General Assembly at its 18th Session in Perth, Australia,

28 November-5 December 1990:

1. ENDORSES the principles of the programme set out in Annex I of the draft IUCN Programme for 1990-1993;
2. CALLS UPON the Director General, within available resources, to:
    a. continue to develop the Women and Natural Resource Management Programme, building upon a continuously expanding and improving knowledge base, seeking a broader funding base, and pursuing new initiatives, especially at regional and local levels;
    b. strengthen the global network of advisers who can support and help expand the Programme;
    c. ensure that IUCN Regional and Country Offices are full partners in this Programme and have the capacity to make appropriate contributions;
    d. increase IUCN's knowledge of the roles, experience and action of women and men, in various categories (young/old, urban/rural, etc.), in natural resource management in different environments;
    e. encourage and take advantage of research among relevant institutions to increase the understanding of women's roles in natural resource management and communicate the results through all available channels, particularly IUCN publications;
    f. collaborate with other international agencies, including non-governmental organizations, which already give high priority to women in development;
3. URGES all governments, development agencies, IUCN and its members to act as catalytic agents in empowering women to play an effective role in natural resource conservation and sustainable development at all levels, by policies and programmes that provide them with the necessary information for understanding development options, by enabling them to have the necessary control over natural resources, and by assisting them to strengthen their institutions and to acquire the appropriate technologies;
4. URGES the Director General, in the immediate future, to ensure that IUCN's objectives in developing its Women and Natural Resource Management Programme are reflected in the preparations for the United Nations Conference on Environment and Development (UNCED) and that the Conference gives due consideration to ways in which women can participate in deliberations about and be enabled to play an effective part in natural resource management.

APPENDIX VI

Meeting on Future Orientations of IUCN's Women and Natural Resource Management Programme

November 30,1990

Report prepared by Dounia Loudiyi

The meeting was opened by the chairperson, Dr Pietronella van den Oever, head of the Social Sciences Division of IUCN. She presented the background of IUCN's Women and Natural Resource Management Programme, which was established following a recommendation put forward during IUCN's 17th General Assembly in San Jose", Costa Rica. She explained that, in the past, communities were viewed as being reasonably homogeneous, leading to undifferentiated assessments of their needs and global actions.

Dr van den Oever went on to explain that, more recently, however, there has been an increasing awareness, within the organization, to separate between various sub-groups in the communities with which IUCN is involved. These sub-groups are generated on the basis of the division of labor and management of natural resources in any given society. Therefore, women do not constitute the only target group of such an analysis, albeit a very important one.

The first speaker, Ms Carolyn Hannan-Andersson, presented a summary of her "Proposal for the Future Orientation of the Program". Ms Hannan-Andersson explained that her presentation was based on a short-term consultancy done for IUCN.

Ms Hannan-Andersson stressed:

- the need for IUCN to insert a social science focus (such as population and women) in its programming and project development;
- the need for social group analysis which would cover communities, households and, as the case may be, individuals;
- the fact that it would be desirable to apply social group analysis to all activities planned;
- the necessity to disaggregate as a tool for successful aggregation;
- gender as one social group variable amongst other equally important and valid parameters;
- that gender roles need to be determined on the basis of gender analysis within the community as well as within households;
- the importance of the *concept* of gender analysis as opposed to the mere use of a given terminology.

Ms Hannan-Andersson went on to present her own evaluation of the WNRMP past performance. She explained that the very existence of the programme has contributed rather substantially to raising awareness about gender issues within the staff of IUCN itself. It has also led to the commencement of a network of professionals dealing with the same issues.

On the other hand, Ms Hannan-Andersson regretted the fact that the programme seemed to have had little catalytic impact on existing IUCN programmes. This could have been the result of several factors such as:

- IUCN's policy on the gender issues remains unclear;
- the lack of precise strategy and workplan for the programme; and
- the lack of definition of the role of the programme; among others.

According to Ms Hannan-Andersson, the new WNRMP would need to be developed within a clearly defined IUCN policy and would address the gender variable as it relates to IUCN's area of expertise, which is the conservation and sustainable management of natural resources.

The programme would seek to develop the professional competence at headquarters as well as widen its regional outreach. This could be implemented by assigning staff members to some or all IUCN regional offices. The programme would also seek to develop and intensify a strong and active regional network.

Ms Hannan-Andersson ended her presentation by selecting areas of priorities for the WNRMP for the triennum 1991-1993. These would include:

- priority of action in the Third World;
- active development of field activities;
- restructuring of National Conservation Strategy processes to include a gender dimension;
- preparation for the June 1992 UN Conference on Environment and Development; and
- preparation 1992 World Parks Congress.

The floor was then given to IUCN's Director General, Dr Martin Holdgate, who made a brief but very focussed presentation on the "Evolution of the Programme and its Potential Role within IUCN". Dr Holdgate started by emphasizing once more the importance of the role of women in the management of natural resources in much of the world.

He stressed the need to ensure that the role of gender is well understood in all of IUCN's programmes and in the field. According to the Director General, the goal is to apply environmental technology in a socially sound way and, therefore to understand the role of individuals within communities as well as the social growth of those communities.

Dr Holdgate explained that, in his view, the first step towards such a goal would be to ensure a full understanding of the concept of gender within the IUCN headquarters staff, which would permeate their thinking as well as their actions. This in turn would lead to spreading such an understanding to IUCN's network worldwide.

The Director General, explained that, ultimately and given the importance of the role of personnel in other programmes to further integrate gender issues, he could conceive of a need for assigning staff positions in all of IUCN's programmes as well as regional offices.

A "question and answer" period followed. The discussion covered the following main issues:

- the overwhelming importance of the role played by women in the management of natural resources in certain regions and societies of the world, and the need to acknowledge that fact;
- the difficulty of regionalizing a programme and the danger of extreme disaggregation of issues; and
- the linkages between population growth in certain parts of the world and the role of women in the management of natural resources.

Finally, a Forum on "Programme Applications in the Region" was held. Members of the panel were:

- Ms Aban Marker Kabraji, Head, IUCN Office/Pakistan
- Dr Patrick Dugan, Head, IUCN Wetlands Programme
- Mr Alejandro Imbach, IUCN Senior Technical Officer at the Regional Office for Central America.

The first speaker, Ms Marker Kabraji, described the successes of the IUCN/Pakistan programme in integrating women in all their activities, despite the rather important difficulties inherent to the Pakistani culture. According to Ms Marker Kabraji, women constitute a natural part of IUCN/Pakistan programme.

Furthermore, gender issues have been integrated in every sector of the Pakistan National Conservation Strategy, as well as in other areas such as the population programme, training, forestry, fisheries and arid zones projects, among others.

Ms Marker Kabraji went on to explain that there were a number of affinities between the women movement and the environmental movement in Pakistan, which, together, brought about a clear change of values in the Pakistani society.

The second member of the forum, Dr Dugan, presented the process of assistance developed within the Wetlands Programme. He explained that in the initial phase of a project, a detailed socio-economic analysis of the relationships between the communities (resource users) and resources is required. Such an analysis then provides the basis for the design of adequate restorative measures, which would then have to be monitored and, as the case may be, adjusted during the implementation phase.

Dr Dugan placed IUCN's inadequate past performance in integrating gender issues in a larger perspective and explained that, in his view, IUCN needs to improve its capacity to include and understand human issues in general.

The third and last member of the Forum, Mr Imbach, raised the question of how to achieve sustainable production in the context of sustainable development. Taking as an example an IUCN project in Nicaragua where women are not a key element in the production system, Mr Imbach expressed the necessity to identify and characterize the main players in production systeMs This, he explained, would allow project officers to better target their actions towards those social groups which are instrumental in the production and in the use of natural resources.

APPENDIX VII

List of Papers Presented During the Workshop Available Upon Request

The full text of the following papers is available in English upon request.

Title of the paper presented	*Name of author(s)*
¨ The Complexities of Sustainability	Pietronella van den Oever
¨ Population and Natural Resources	James Ypsilantis
¨ Planning for Sustainable Development: Case study from Indonesia	Riga Adiwoso-Suprapto
¨ Water Scarcity - The Forgotten Dimension	Malin Falkenmark
¨ Demographic Pressure on Natural Resources in Latin America	Richard Bilsborrow
¨ The Strategies of the UN Population Fund	Katsuhide Kitatani
¨ Australian Families Facing Population and Natural Resource Interactions	Dianne Proctor
¨ The Changing Structure of Korean Families	Ock-Kyung Kim
¨ Lessons from IUCN Case Studies in Population and Natural Resources	Dulce Castleton
¨ Population Pressures in Tropical Forests: Protection of Biological Diversity in Brazil	Ana Maria Paiva da Fonseca
¨ The Baudha-Bahunepati Family Welfare Project in Nepal	Keshari Kansakar
¨ Concept Paper on Population-Environment Linkages (included in this volume)	Wila D. Mung'Omba

If you wish to receive any of these papers please send this form back to:

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