

advantage would be gained from an international set of regional case-studies, involving both East and West but with emphasis on Central Europe. Such case-studies should include analyses of how various stakeholders might react to a range of forest-decline scenarios. Support for forest-decline research should be shared among governments, industry, forest landowners, and international organizations.

#### *Future Forest Resources*

The Workshop agreed that the best way to explore possible effects of forest decline on future forest resources would be to construct consistent and complete scenarios based on a combination of explicit assumptions, forecasting models, and expert opinion. Scenario-building should be interdisciplinary—including at least climatological, ecological, social, and economic, factors—to make results of the greatest potential value to policymakers in their considerations of the future potential of forest resources under conditions of decline.

#### *Trade and Markets*

No significant regional market disturbances have yet occurred that can be attributed to pollution-induced forest decline. However, given current patterns of forest decline, particularly in Europe, future disturbances to roundwood and forest-product markets, trade patterns, and industry structure, due to forest decline, cannot be ruled out. Indeed, changes in the timber-supply situation in Europe may lead to disturbing consequences for timber-exporting nations in other continents. The Workshop concluded that exchange of information between timber producers and timber-processing industries, as well as among wood-product importing and exporting nations, should be improved.

#### *International Cooperation*

Forest decline is clearly a multinational problem in many respects, including transboundary air-pollution, policies for emission reductions, global forest-product markets, research, and resources for mitigating the problem. Therefore, the Workshop stressed the need for strong international cooperation in these areas (such as the Conven-

tion on Long-range Transboundary Air Pollution), as well as coordinated actions by governments and industries to alleviate the problem. The Workshop urged all responsible concerned public as well as private and commercial interests to join forces in a concerted effort to improve the condition of forests.

#### *Conclusion*

The forest-decline problem embraces environmental, social, and economic, implications as well as timber considerations. Therefore, the Workshop concluded that efforts to understand better than hitherto, and manage the consequences of, forest decline must deal with complete ecosystems in which Man is an integral component at once from biological, technical, social, economic, and psychological, points of view.

The Workshop also agreed that the extent and causes of forest decline are different in different regions of Europe and elsewhere, because of differences in factors such as pollutant types and loadings, forest types, climatic conditions, site conditions, and silvicultural regimes. At this time, it is possible only to deliver simple, general recommendations on the steps necessary to avoid continued and new forest decline in the future. Such recommendations must be adapted to actual conditions prevailing in specific local or regional cases of forest decline; but the knowledge required to do this is usually not available. The Workshop concluded that strong efforts must be made as soon as possible to generate this basic information for effective international decision-making.

Finally, the Workshop agreed that clear and consistent national policies related to the forest sector and to pollution, as well as international cooperation in air-pollution control measures and exchange of research and monitoring results, are required. It was recognized that IIASA is an appropriate institution to catalyse such cooperation.

PETER N. DUINKER  
Biosphere Project, Environment Programme  
International Institute for Applied Systems Analysis  
A-2361 Laxenburg  
Austria.

### **AIDS—An International Perspective**

We are witnessing the beginning of a world-wide epidemic of AIDS (Advanced Immunodeficiency Syndrome) and infection with its causative agent, the human immunodeficiency virus (HIV). AIDS must now be considered a potential threat to a large number of the world's citizens, and we must respond accordingly.

When AIDS was first recognized in 1981, the disease seemed limited to a single nation and to a single group characterized by its sexual orientation. Today, while most people recognize that AIDS is occurring in many countries, relatively few are aware of the truly global scope of the problem and, sadly, many remain ignorant about the risk factors associated with HIV infection.

Reflecting 'intense international interest and concern' about AIDS, the 39th World Health Assembly, on 16 May 1986, formally endorsed the commitment of the World Health Organization (WHO) to a global strategy for prevention and control of HIV infection. In this article we propose to review current knowledge about AIDS as an international health problem and summarize the WHO perspective and plans for global HIV prevention and control.

#### *Global Epidemiology*

As of 20 October 1986, a total of 33,217 AIDS cases were reported to WHO from 101 countries representing all continents. The largest number of these reported cases, 28,592, or 86% of the total, are from the Americas. Europe has reported 3,245 cases, Africa 1,008, Oceania 317 (all from Australia and New Zealand), and Asia 55 cases.

This official case-list only reflects to a limited extent the actual scope of the current AIDS problem. Given the emotional and political climate which surrounds AIDS, we consider the reporting of even a fraction of known AIDS cases by national health authorities to express national willingness to deal constructively with the AIDS problem. In addition, insufficient AIDS diagnostic capacity and health-reporting infrastructure in many countries of the 'developing world' tends to reduce the number of reported, as compared with actual, AIDS cases.

In the Americas, 91% of cases, or 26,002, are reported from the United States where the epidemiological characteristics may be considered typical of 'Western' AIDS. The United States government estimates that between 1 and 1.5 million US residents are HIV-infected and that approxi-

mately 270,000 AIDS cases will be likely to have occurred by 1991. Several other countries contribute substantially to the AIDS case-total for the Americas, including: Brazil (754), Canada (638), Haiti (501), Mexico (161), and Trinidad and Tobago (108). With the exception of Haiti and possibly some other Caribbean areas, the epidemiological pattern is 'Western', primarily involving infection of homosexual and bisexual men and/or intravenous drug abusers. The epidemiological pattern in Haiti appears somewhat intermediate between the 'Western' and the 'African' pattern described below. Finally, an additional 27 countries in the Americas have each reported from 1 to 68 AIDS cases.

Europe reported 3,245 AIDS cases, with the largest number from France (806), the Federal Republic of Germany (675), the United Kingdom (512), and Italy (300). Five countries in the region have officially reported no AIDS cases (Bulgaria, the German Democratic Republic, Hungary, Poland, and the Soviet Union). AIDS cases among Europeans are typical of the 'Western' epidemiological pattern. Based on current trends, an estimated 25,000 to 30,000 AIDS cases are expected to have occurred in Europe by the end of 1988.

The only cases thus far reported from Oceania are from Australia (306) and New Zealand (11), and fit 'Western' HIV patterns.

#### *Africa Generally Worst*

The African and Asian AIDS situations appear radically different. Central, Eastern, and parts of Southern, Africa are experiencing epidemic HIV infection, and there is increasing evidence regarding a West African focus of additional human retroviral infections (caused by the French-discovered LAV-2 and the US-discovered HTLV-4, which may or may not be identical) in Western Africa. No area of the world is more affected by HIV than Africa, in terms of the proportion of the otherwise healthy population infected, and the probable numbers of AIDS cases. The geographic scope and intensity of HIV infection in Africa is difficult to assess, due to limited infectious disease surveillance and laboratory serodiagnostic capabilities, and the lack of a widely accepted clinical case definition for AIDS.

The proportion of healthy adults with serological evidence of HIV infection in the countries from AIDS-epidemic regions of Africa ranges from 4 to over 30%, although many of these studies have involved rather small and selected populations. The annual incidence of clinical AIDS in some Central African cities is at least 500 to 1,000 per million of the population. A minimum estimate for the African continent includes one million HIV-infected persons and 10,000 cases of AIDS annually.

#### *Modes of Transmission*

While the basic modes of HIV transmission in Africa are identical to those in the developed world (e.g. sexual, blood contact, or perinatal), several important regional variations exist. The dominant mode of HIV transmission in Africa is sexual, involving heterosexual and bidirectional (man to woman; woman to man) transmission of the virus. Not surprisingly, HIV seroprevalence rates among African women prostitutes are quite high, generally ranging from 25 to 90%. The importance of blood transfusions for HIV transmission in Africa is suggested by the high proportion of infected (although healthy) blood donors, which reaches 6 to 15% in some areas. Whilst intravenous drug abuse is virtually unknown in Africa, the problem of contaminated needles exists in other ways, such as injections for medical

purposes. Any instrument that becomes contaminated with the blood of one person and which is then used, without proper sterilization, to pierce the skin of another person, can be a vehicle for HIV transmission. Finally, as HIV is heterosexually transmitted, pregnant women are among those in Africa who are likely to be HIV-infected, with resulting transmission of the virus directly to their children—either before, during, or shortly after, birth. While the efficiency of this mother-to-child spread is currently unknown, in areas of Africa where 10% of pregnant women are HIV seropositive, as many as 5% of all newborns may be HIV-infected. Paediatric AIDS—particularly difficult to recognize where malnutrition and respiratory and gastrointestinal infections are common paediatric problems—is of increasing concern in Africa.

In dramatic contrast to Africa, HIV has only started to appear in Asia. A small number of AIDS cases have been reported from India, China, Taiwan, Hong Kong, Japan, and Thailand. These cases have either been related to imported blood and blood products, or to sexual transmission (female or male prostitutes). Serosurveys have demonstrated little or no evidence of HIV infections in general populations, yet infections have occurred among members of particular risk-groups. The opportunity for protection of Asia against widespread dissemination of HIV is obvious, and may be vital to the future of that continent.

#### *Global AIDS Control Strategy*

The international HIV situation is dynamic, yet agreement exists on the basic concepts and components of global AIDS prevention and control. The WHO global assessment includes the following concepts:

- (1) HIV infection is an international health concern;
- (2) Infection with HIV is an adverse health outcome of profound personal and public-health importance;
- (3) HIV infections threaten the limited gains in health which have been achieved in several areas of the Third World;
- (4) Neither vaccine nor therapy for widespread use is likely to become available for at least several years;
- (5) The HIV global control effort will be long-term and will be likely to last beyond the present generation;
- (6) HIV prevention and control programmes must be integrated with primary health-care; and
- (7) HIV infection represents an unprecedented challenge to public health which mandates a response of unprecedented creativity, energy, and resource.

The WHO AIDS Control Strategy involves coordinated and complementary actions at the international and national levels.

*International level:*—The primary WHO headquarters and regional responsibility is coordination, involving:

- (1) Exchange of information on HIV epidemiology, legislation, and policies, introduced by Member States;
- (2) Preparation and distribution of guidelines for the diagnosis, surveillance, prevention, and control, of HIV—directed towards the general public, groups at increased risk, and health-care workers;
- (3) Assessment of commercially available antibody (or other) test kits, and stimulation of research towards development of tests for field use in Third World countries;
- (4) Advice to Member States on the provision of safe blood and blood products;
- (5) Coordination of research on therapeutic agents, vaccines, and simian retroviruses; and

(6) Cooperation with Member States in the development of national programmes/actions for the prevention and control of HIV.

*National level:*—A plan of action for AIDS control is needed for all countries. When once the national HIV epidemiological situation has been assessed, the four major components of the national prevention and control programme can be implemented. These four basic programme components include:

- (1) a surveillance system;
- (2) laboratory and support capability;
- (3) education/information for health-care workers; and
- (4) prevention efforts directed to the general public and to specific risk-groups in the population.

The Control Programme on AIDS at WHO Headquarters has been endorsed by the governing bodies (Regional Committees, Executive Board, and the World Health Assembly), and the necessary resources are now becoming available to assist Member States in the design and implementation of their national AIDS control programmes.

### *Challenge to Society*

HIV infection has created a serious challenge to medical and public-health practice and even to the fabric of society. If we follow the logic of our epidemiological knowledge, HIV prevention will require long-term changes in sexual behaviour, important modifications in blood services and certain medical and paramedical practices, and aggressive approaches to control of perinatal transmission. We cannot

imagine a more difficult, serious, or complex, set of challenges. Yet we can afford complacency even less, or pessimistic resignation regarding the individual and societal capacity to alter behaviour in response to a clearly perceived threat. Let us be as clear and scientific as possible in our analysis of HIV as a global public-health problem. Let us unite our resources, material and intellectual, in the confrontation with this virus and its associated disease states. Let us apply the lessons from our heritage of national and international public-health experience, allied to the creativity and vision which the present situation demands.

AIDS may be, or may become, one of the most serious threats to public health in this century; yet we can all still have something to say about the matter. We are working together on AIDS during one of those rare historical moments—at the beginning, really, of a major new global public-health challenge. Our responsibility is accordingly heavy, and our opportunity to make a difference similarly great. Through the actions which we take, or fail to accomplish, during the next few years, we will indeed be judged by future generations.

FAKHRY ASSAAD, *Director*  
*Division of Communicable Diseases*

&

JONATHAN M. MANN, *Responsible Officer*  
*Control Programme on AIDS*  
*World Health Organization*  
*1211 Geneva 27*  
*Geneva, Switzerland.*

## Cataclysmic and Global Changes

*At its latest (21st) General Assembly, held in Bern, Switzerland, the International Council of Scientific Unions (ICSU) organized two symposia to look at the Environmental Consequences of Nuclear War and at the changes that are taking place in, on, and around, our Globe.*

### *Environmental Consequences of Nuclear War*

A major study on the Environmental Consequences of Nuclear War was completed in 1986 by ICSU's Scientific Committee on Problems of the Environment (SCOPE). This scientific, independent examination of the consequences of nuclear war came to the following general conclusions:

1. Multiple nuclear detonations would result in considerable direct physical effects from blast, thermal radiation, and local fallout. The last would be particularly important if substantial numbers of surface bursts were to occur, as the lethal levels of radiation from local fallout would extend for hundreds of kilometres downwind of detonations.
2. There is substantial reason to believe that a nuclear war could lead to large-scale climatic perturbations involving drastic reductions in light-levels and temperatures over large regions within days, and to changes in precipitation patterns for periods of days, weeks, months, or longer. Episodes of short-term, sharply-depressed temperatures could also produce serious impacts—particularly if they occur during critical periods within the growing-season. There is no excuse for asserting with any confidence that there would be no effects of this character and, despite uncertainties in our understanding, it would be a grave error to ignore these potential environmental effects. Any consideration of a post-nuclear-war world would have to consider the conse-

quences of the totality of physical effects. The biological effects then follow.

3. The systems that currently support the vast majority of humans on Earth (specifically, agricultural production and distribution systems) are exceedingly vulnerable to the types of perturbations that are inevitably associated with climatic effects and societal disruptions. Should those systems be disrupted on a regional or global scale, large numbers of human fatalities associated with insufficient food-supplies would be inevitable. Damage to the food distribution and agricultural infrastructure alone (i.e. without any climatic perturbations) would put a large portion of the Earth's human population in jeopardy of a drastic reduction in food availability.
4. Other indirect effects from nuclear war could—individually and in combination—be extremely serious. These include disruptions of communications, of power distribution, and of societal systems, on an unprecedented scale. In addition, potential physical effects include reduction in stratospheric ozone, and, after any atmospheric smoke had cleared, associated enhancement of ultraviolet radiation, significant global-scale radioactive fallout, and localized areas of toxic levels of air and water pollution.
5. Therefore, indirect effects on human or other biotic populations of a large-scale nuclear war—particularly the climatic effects caused by smoke—could be potentially more consequential globally than the direct effects, while the risks of unprecedented consequences are great for combatant and noncombatant countries alike.

The Committee responsible for the study concluded that: 'Because of the possibility of a tragedy of an unprecedented dimension, any disposition to minimize or ignore the widespread environmental effects of a nuclear war