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**HEALTH, ENVIRONMENT AND DEVELOPMENT**

**Approaches to Drafting Country-Level Strategies  
for Human Well-Being under Agenda 21**

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## Contents

FOREWORD .....	i
1. BASIC INTERACTIONS .....	1
Environmental factors and health .....	1
Development and environmental change .....	4
Development for health .....	4
2. HEALTH AND ENVIRONMENTAL TRENDS: THE NEED FOR ACTION .....	6
Environmental factors affecting health .....	6
Health-affecting environmental trends .....	12
Country capabilities for environmental health protection and promotion .....	16
3. POLICY APPROACHES FOR HEALTH-ENVIRONMENT STRATEGIES .....	17
The need for health-environment strategies .....	17
Shared principles for health-environment strategies .....	17
Intersectoral cooperation in health and the environment .....	19
Public health and health sector functions .....	20
4. ELEMENTS OF NATIONAL AND LOCAL STRATEGIES .....	23
Orientation, general objectives and global priorities .....	23
Formulating strategies .....	24
Modes of action .....	29
Actions to strengthen capacity .....	31
Improving knowledge and "know-how" .....	34
5. INTERNATIONAL ASPECTS .....	37
Transboundary and global problem-solving .....	37
International cooperation and support .....	37
The role of WHO and collaborating organizations .....	38

## FOREWORD

Over the past half century, the forces of national independence, population growth, technological advancement, and socioeconomic development have transformed the environments that determine human health. Whether we look at the global climate, altered regional ecosystems, patterns of urban living, the movement of ideas, or agricultural production methods, we see continuing and rapid environmental change.

Many of the positive and negative health effects of these environmental changes are well known. Socioeconomic development has improved the health status of millions and extended their longevity; underdevelopment denies health to other millions. At the same time, development widens the range of health hazards, with global impacts that, if unchecked, could render the planet unable to meet the needs of the human species.

These concerns for human well-being were given new prominence in the 1992 United Nations Conference on Environment and Development (UNCED) - the "Earth Summit". UNCED made it clear that our health prospects depend on whether we properly and sustainably develop our natural and social environment. Health cannot be separated from a myriad of environmental elements as diverse as air and freshwater, poverty and urban concentration, chemicals and disease vectors, overconsumption and underdevelopment, technology and trade. These conclusions, and the agreements reached at UNCED, compel new thinking, new policies, and new action programmes. Only systemic approaches can ensure that the health gains of recent decades will be retained and that good health can be attained by the billions of our contemporaries to whom decent environmental conditions are denied - or by generations to come.

This document spells out the health implications of current environmental trends and of Agenda 21, UNCED's charter for action in the coming years. It is addressed not only to national and local health leaders, but also to the decision-makers in all governmental and private sectors, including business and non-governmental organizations. It outlines the broad and stable cooperation that will be needed, in countries and internationally, to ensure the survival of the human species and the advancement of its well-being. It incorporates the findings and recommendations of the WHO Commission on Health and Environment (1989-91), which provided an important input to UNCED and Agenda 21. It also includes contributions from WHO's global and regional governing bodies, expert panels, and key intersectoral meetings on environmental health and health promotion.

Fundamentally, these approaches to health in sustainable development are not new, and we have already moved past the starting line. Our awareness of the relationship between health, environmental safeguards and equitable socioeconomic development was crystallized by the 1977 World Health Assembly in the policy of Health for All and in the 1978 Declaration of Alma-Ata on Primary Health Care. Many WHO Member States have used this policy base to build the needed institutional foundations, even during a decade of economic hardship in most developing countries. What has changed is our understanding of environmental trends and our appreciation of the need to deal with the totality of human environments. If we are to attain Health for All, we must deal not only with development's outcomes and benefits, but also with its processes and costs.

In light of Agenda 21's call - "Countries ought to develop plans for priority actions" - this document has three purposes:

- to summarize our knowledge of health and environment relationships, the problems that face us, and the scientific and experiential guides to action that are available to us;

- to state the principles and provide the information needed to formulate and implement needed inputs on health as part of local, national and international strategies for sustaining environments in the medium and long term; and
- to identify priority needs for additional scientific, technical and programmatic knowledge - an agenda for basic and applied research.

The goal of environmental strategies for health, as set out in Principle 1 of the Rio Declaration on Environment and Development is clear:

**Human beings are at the centre of concerns for sustainable development. They are entitled to a healthy and productive life in harmony with nature.**

Attaining this goal of healthy people in a healthy environment requires far more than the application of medical technology or even the total efforts of health sectors working alone. Integrated efforts by all sectors, organizations, and individuals are required to make socioeconomic development sustainable and humane, ensuring a sound environmental basis for health. Within such cooperative efforts, health workers have distinct leadership, advisory, and support functions to perform, not the least of which is to serve as informed advocates of human well-being in ways that are relevant to the coming century.

## CHAPTER 1. BASIC INTERACTIONS

### Environmental factors and health

Like all living things, human beings depend on their environments to meet their needs for health and survival, even while they seek to withstand or avoid harmful environmental conditions and events. Better living conditions account for much of the improved health in industrialized countries since 1850, as well as for the increased longevity and some lowered infant mortality rates in developing countries. But when the environment no longer meets human needs for sufficient and safe supplies of food, water, and shelter - because of inadequate resources or because of maldistribution - health suffers. When people are exposed to hostile environmental agents - microorganisms, toxins, armed enemies, or drunken drivers - health suffers. When the environment both fails to meet basic needs and is rife with hazards, which is the situation for hundreds of millions in the developing countries and millions in the industrialized countries, health suffers even more.

Compared with other species, humans have extraordinary abilities to adapt to their environments, but even more to manipulate their environments to meet their needs. They have learned, for example, to produce food as well as gather it, to limit their exposures to weather extremes and parasites, and to take collective measures to protect themselves against hostile beings and adverse conditions. From their history and by their own devising, people acquire practices (culture) and structures (e.g., cities, highways, machines) that enable them to cope better with the natural environment. These cultures and structures themselves make up complex, dynamic social environments.

Most people's interactions with the natural environment are modulated by their social environments. Because they control how resources are used and how goods and risk exposures are distributed, social environments are the dominant determinants of human well-being. Over recent decades, two forces in the social environment have increasingly affected the natural environment and its capacity to support human life: (1) consumption patterns that excessively deplete and pollute environmental resources; and (2) growth in the numbers and concentrations of people, which increase pressures on the biosphere's resources and frustrate the provision of health-sustaining environments.

The complexity of environmental interactions with health are indicated in Table 1, which is based on the subjects covered in Agenda 21, the "action document of the 1992 United Nations Conference on Environment and Development (UNCED) - "Earth Summit". The columns are based on five priority programme areas in Chapter 6, Protecting and promoting human health, discussed in Chapter 4 below. The rows indicate the subjects of other chapters, and cell entries indicate the intensity of interactions between those factors and major health problems.

In relation to human health, then, the "environment" includes not only the physical and biological elements of nature, but also human-based social systems - cultural, artifactual, economic, political, technological, spiritual, and relational - that make up the settings in which people live. Whether a person is adequately fed or hungry or overfed, for example, depends not only on the state of natural resources but also on social factors, such as how agricultural practices use or misuse those resources, how many are to be fed, whether safe and nutritious food is available where and when it is needed, whether that food is affordable, and what food choices people have learned to make. Likewise, children's absorption of lead results less often from exposures in nature than from industrial processes, vehicular fuel choices, settlement patterns, air pollution controls, domestic paint standards, and parental ignorance. The incidence of cholera reflects how well or poorly social systems use engineering and health education to shield people from the

TABLE 1

**INTERACTIONS BETWEEN PRIORITY HEALTH GOALS AND  
ENVIRONMENTAL AND SOCIAL ELEMENTS IN AGENDA 21**

**Priority programme areas in Chapter 6 of Agenda 21  
Protecting and promoting human health**

Degrees of interaction

x = significant  
xx = substantial  
xxx = intense

**Meeting  
primary  
health  
care  
needs**

**Control  
of commu-  
nicable  
diseases**

**Protecting  
vulnerable  
groups**

**Meeting  
urban  
health  
chal-  
lenges**

**Reducing  
health risks  
from pollu-  
tion/hazards**

Agenda 21 Chapters/Subjects

## I. SOCIAL AND ECONOMIC DIMENSIONS

2. Economic/trade relations	xx	x	x	x	xx
3. Combating poverty	xxx	xx	xxx	xxx	xx
4. Changing consumption patterns	x			xx	xxx
5. Demographic dynamics	xxx	xx	xxx	xxx	xx
7. Human settlements development	xxx	xx	xx	xxx	xxx
8. Integrating environment and development in decisions	xx	xx	x	xx	xx

## II. CONSERVATION AND MANAGEMENT OF RESOURCES FOR DEVELOPMENT

9. Protection of the atmosphere	x	x	xx	xx	xxx
10. Land resources planning/mgt	xx	xx	x	xx	xx
11. Combating deforestation	x	x	x		xx
12. Desertification and drought	xx		xx		
13. Mountain ecosystems	xx		x		x
14. Agricultural and rural development	xxx	xx	xxx	x	xxx
15. Conserving biodiversity	x	xx	x	x	
16. Managing biotechnology	xx	xxx	xx	xx	xxx
17. Protecting oceans, seas, and coastal areas	xx		x	xx	xx
18. Freshwater quality and supply	xxx	xxx	xx	xxx	xxx
19. Managing toxic chemicals	x	xx	x	xx	xxx
20. Managing hazardous wastes	x	xx	xx	xx	xxx
21. Managing solid wastes and sewage	xxx	xx	xxx	xxx	xx
22. Managing radioactive wastes			x		xxx

TABLE 1 (continued)

Priority programme areas in Chapter 6 of Agenda 21 Protecting and promoting human health					
Degrees of interaction	Meeting primary health care needs	Control of commu- nicable diseases	Protecting vulnerable groups	Meeting urban health chal- lenges	Reducing health risks from pollu- tion/hazards
x = significant					
xx = substantial					
xxx = intense					
<b>Agenda 21 Chapters/Subjects</b>					
<b>III. STRENGTHENING THE ROLE OF MAJOR GROUPS</b>					
24. Women	xxx	xx	xxx	xx	xx
25. Children and youth	xxx	xx	xxx	xx	xx
26. Indigenous peoples	xx	xx	xxx		xx
27. Non-governmental organiza- tions	xxx	xx	xxx	xxx	xx
28. Local authorities	xx	xx	xx	xx	xx
29. Workers and trade unions	xx	x	xxx	xx	xxx
30. Business and industry	xx	x	xx	xxx	xxx
31. Scientific and technical communities	xx	xx	xx	xxx	xxx
32. Farmers	xxx	xx	xx	x	xx
<b>IV. MEANS OF IMPLEMENTATION</b>					
33. Financial resources and mechanisms	xx	xx	xx	xx	xx
34. Technology and its transfer	xx	xx	x	xx	xxx
35. Science	xx	xx	xx	xx	xxx
36. Education, public awareness and training	xxx	xxx	xxx	xxx	xxx
37. Capacity-building	xxx	xxx	xxx	xxx	xxx
38. International institutional arrangements	x	xx	x	x	xx
39. International legal instru- ments and mechanisms		x	x		xxx
40. Information for decision- making	xx	xx	xx	xxx	xxx

natural hazard of vibrio cholerae; surviving the disease depends almost completely on whether adequate health care exists in a person's social environment.

### **Development and environmental change**

Development processes change environments by altering the production of goods, social and personal wealth, living standards, and the provision of amenities, all of which affect health. Development modifies both the natural and social environments in varying degrees, according to its focus. **Economic development** generally exploits natural resources in order to increase wealth and security, subject to social controls. **People-centred social development**, such as strengthened education and sanitary infrastructure, affects well-being directly by increasing protections and people's adaptability, and indirectly by raising the capacity of individuals and communities to function effectively. **Political development** seeks to improve the management of collective affairs and how people participate in them. The various aspects of development, which are often treated as distinct and separate, interact strongly: for example economic development changes people's status, living patterns and behaviours.

Environmental changes induced by development have both beneficial and adverse effects, some of them indirect and unintended, all of them involving trade-offs between the benefits and costs of improvements. Equitable economic development generally tends to improve human well-being. Generally also, such development has costs in resource depletion and the generation of wastes that pose hazards to health when they pollute the natural environment or degrade living conditions. Urban development creates increased opportunities for productivity, economies of scale, and cultural enrichment, but is often accompanied by such adverse conditions as congestion, pollution, crime, institutionalized poverty, and social alienation. A century of rapid socioeconomic changes - soaring population growth, political and economic revolutions, massive movements of people between and within countries, and unprecedented technological innovation and diffusion - has also produced new configurations of human and environmental stresses, including the impact of the development experience on people's social, cultural and material lifestyles and raising also the dominating issue of sustainability.

### **Development for health**

Socioeconomic development can promote and protect health when it induces environmental changes that:

- provide equitably and efficiently for people's access to food, shelter and basic protections against environmental risks;
- avoid or compensate for side effects of development that adversely affect health;
- remedy and reduce adverse physical and social conditions;
- reduce risks to, and foster the well-being of, such vulnerable groups as children and youth, women, and the elderly;
- minimize exposures to hazards in occupation, transportation and residence;
- improve physical and social infrastructures, including environmental management, that safeguard the community's health and security;
- through education and access, increase people's ability to advance their well-being cooperatively; and



- use planetary and ecosystem resources sustainably - controlling demand, minimizing waste, and protecting the integrity of nature.

Making a reality of an agenda of "development for health" requires wide participation by the sectors, organizations, and households that make up human communities - local, national, and global. The critical task is to formulate strategies and mobilize resources to improve health and its socioeconomic base through sustainable development. Action is required in the rural, urban and global environments.

## CHAPTER 2. HEALTH AND ENVIRONMENTAL TRENDS: THE NEED FOR ACTION

The struggle to attain and maintain health is one that can never end. Now, social and economic changes in the environment have made that struggle critical in many countries and cities, because recent environmental changes pose unprecedented threats to the planet and its inhabitants. *"Development for health" that modifies environmental trends is now imperative.*

"Development for health" is technologically feasible. In the industrialized countries since 1900, a dramatic reduction of infectious disease deaths and illness, chronic lung diseases and certain types of accidents, resulted mainly from improved environmental conditions, such as dependable supplies of safe drinking water, basic sanitation and solid wastes management, proper shelter, and improved food availability and safety. These countries have also attacked health problems caused by "modern hazards" including motor traffic accidents and air pollution, improper management of toxic chemicals and hazardous wastes, and heavy industrial pollution. In addition to making further progress on such problems, these countries are now challenged to reduce the environmental impacts of their high-consumption economies and to ensure the health protection of their growing minorities of the poor and homeless.

Most developing countries face a broader and more severe array of environmental health needs. Although "underdevelopment" and poverty continue to make communicable disease mortality and morbidity their major health problems, the side effects of development have increased health risks from "modern hazards". Further, their ability to meet both traditional and new health challenges is compromised by severe shortages of technological, management, and financial resources. These shortages are intensified by rapid population and urban growth, by stagnating economies, and by poor health itself, which weakens the human resource base needed for sustainable development.

The two main elements in the health and environment equation are: (1) how environmental factors affect health; and (2) how current environmental trends are changing the patterns of health risks.

### Environmental factors affecting health

The dual effects of environmental factors on health are illustrated in Table 2, drawn from *Our Planet, Our Health*, the report of the WHO Commission on Health and the Environment. This table summarizes, in bold type, the contributions that development in several sectors makes to health and, in greater detail, how improperly managed development can have negative impacts. It also provides examples of preventive and remedial actions to reduce adverse effects.

The main environmental factors affecting health include:

**Drinking water supply and sanitation.** As much as 80% of all sickness and disease in developing countries has been attributed to lack of safe water and appropriate means of excreta disposal. Illnesses to which a lack of safe water contributes - along with food contamination and unhygienic practices - include diarrhoeal diseases (with perhaps 1,500 million episodes and 4 million deaths per year), trachoma, schistosomiasis and conjunctivitis. Mere access to water does not guarantee safe water; water supplies must be managed and sources protected. The fact that an estimated 90% of all waste water in Latin America is untreated has been linked to the recent epidemic of cholera. Dracunculiasis, a debilitating disease in Africa and parts of Asia, is being eliminated through simple water source protection.

TABLE 2

HEALTH IMPLICATIONS AND ACTIONS BY DEVELOPMENT SECTORS<sup>1</sup>

SECTOR AND HEALTH-RELATED ACTIVITIES	HEALTH IMPLICATIONS	PREVENTIVE AND REMEDIAL ACTIONS
<b>FOOD SUPPLY</b>		
<u>Problematic aspects</u>		
Undependable production/avoidable losses/maldistribution	Secure supplies of safe food are essential to human life and health	Promote good production and consumer practices Educate for good diets
	Inadequate nutrition/associated infections/long-term somatic and psychological effects	
Poor use of technologies, including irrigation practices	Worker accidents and infections (zoonotic, vector-borne)	Link protection of workers and resources in production
Inadequate worker protection	Damage to water resources and aquatic life	Integrate health goals into agricultural policies
Production skewed to animal husbandry	Soil and water pollution; methane build-up	Strengthen research
Improper use of chemicals	Soil depletion, deforestation, salinization	Integrate pest control
	Worker and consumer poisonings and effects of sub-acute, long-term exposures to residues, additives, and polluted environmental media	Make agricultural extension more relevant, participative
Improper food handling, in production, storage, distribution and use	Food-borne diseases	Educate food handlers, commercial and domestic Reduce avoidable food losses
Avoidable depletion of basic agricultural resources	Insecurity of food supplies (local short-term and global long-term)	Integrate farming, forestry, and water resource management

<sup>1</sup> SOURCE: Our Planet, Our Health: Report of the WHO Commission on Health and Environment, Geneva, 1992.

TABLE 2 (continued)

SECTOR AND HEALTH-RELATED ACTIVITIES		HEALTH IMPLICATIONS	PREVENTIVE AND REMEDIAL ACTIONS
<b>WATER RESOURCES</b>			
<u>Problematic aspects</u>			
Inadequate water supply development and increasing demand, leading to aquifer depletion, salinization and overburdened surface supplies	Large-scale water impoundments, poorly planned/managed	Adequate supplies of safe water for drinking and hygiene are directly needed for health; agricultural and industrial water supplies are indirect requirements	Improve water resource management
		Changes in vector populations; increases in water-related diseases	Strengthen vector control
Water quality degraded by biological, chemical and thermal pollution		Local and regional shortages of water needed for sanitation and hygiene, drinking, and economic development	Set proper and fair pricing policies
		Epidemics and outbreaks of diarrhoeas and other water-related diseases	Extend/maintain supply/sanitary/treatment infrastructure
<b>ENERGY</b>		Deteriorated aquatic food supplies	Prevent and abate pollution
		Economic and social development depend on adequate energy supplies, over and beyond energy needs for cooking, heating and cooling	Educate consumers in proper use and personal/domestic hygiene
<u>Problematic aspects</u>			
Commercial energy generation	Fossil fuel	On-job and community-affecting hazards and accidents	Energy conservation
	Nuclear	Outdoor air pollution, CO <sub>2</sub> build-up, acid rain	Improved safety controls in production
Hydroelectric		Accidental exposures via contaminated air, water, soil	Effective control of pollution from power generation and vehicular use
		Alterations in vector populations with increased incidence of parasitic and other water-related diseases	Incorporate health implications in planning
Use of biomass for heating and cooking		Indoor air pollution, in relation to respiratory diseases	Improved ventilation of homes and devices
Fossil fuels used in motor transport		Urban air pollution by gases, particles and heavy metals, associated with respiratory and neurological diseases and cancers; accidental deaths and injuries	Reduced use of fossil fuels; development of alternatives
			Accident prevention; disaster response readiness

TABLE 2 (continued)

SECTOR AND HEALTH-RELATED ACTIVITIES	HEALTH IMPLICATIONS	PREVENTIVE AND REMEDIAL ACTIONS
INDUSTRY		
<u>Problematic aspects</u>		
Use of hazardous substances and processes	Industrial production contributes to higher living standards, provides for employment, and increases social wealth	Improved occupational safety and accident prevention Preventive planning; siting to buffer residential areas
Hazardous products; misuse of products	Acute and long-term exposures of workers and proximal populations to hazardous agents and accident risks	Product safety controls; consumer and driver education
Generation, movement, and disposal of wastes	Injuries to users and consumers	Effective, economical pollution controls and abatement, under monitoring Improved conservation and waste minimization measures Controls on transportation of wastes
Unregulated industries, especially small workshops	Pollution of air, soil and waters (ground and surface waters, coasts) with direct and secondary health effects on humans and the food chain	Stronger regulation and education of entrepreneurs and workers
	Increased probabilities of adverse exposures of workers and neighbourhoods	

Health considerations played a major role in the International Drinking Water Supply and Sanitation Decade of the 1980s. In developing countries, urban dwellers' access to water improved from 67% to 77%, and to sanitation from 58% to 63%, despite the fact that their populations grew by 23% in that decade. Rural water supply coverage increased from 30% to 50%, representing an estimated 270 million additional people served, but only 15% of the rural population have access to adequate means of sanitation. For both urban and rural areas ensuring the safety of drinking water lagged behind increases in supplies.

**Shelter and habitat.** Shortfalls in the provision of adequate, health-protecting shelter are a function of family and community poverty. Unmet housing and other infrastructure needs adversely affect the health of about a third of urban residents in developing countries. Low income, limited education, uncertain employment, insecure residential tenure, and poor health care go hand in hand with inadequate, overcrowded shelter that lacks basic sanitation and other minimal health protection. Residents are exposed to disease pathogens, pollutants, violence, and accident risks, often in conditions that breed alienation and psychosocial dysfunctions.

**Diet.** Even though world production of grains has more than matched population growth, with the environmental costs noted below, poor food distribution and utilization results in inadequate diets for many millions. Apart from foodborne diseases, the health effects of inadequate diet include starvation under disaster conditions, undernutrition reflected in excess numbers of underweight births, and nutrition so marginal as to undermine resistance to infections and deny proper growth and development to millions of children.

**Environmental pollution.** Biological, chemical and physical contamination of air, soil, food and water, including the oceans, results in a broad spectrum of health problems. A WHO assessment in 1988 showed that, while some pollution problems are being reduced in industrialized countries, they are worsening rapidly in the developing countries, particularly in their large and growing cities, where health-based environmental quality norms are regularly exceeded.

Urban air pollution is implicated in acute and chronic lung diseases, heart disease, lung cancers, and neurological damage in children. In the past decades, some of the highest air pollution levels were found in cities in developing countries (for sulfur dioxide, 7 of the world's 10 worst), where effects may be more severe because of tropical climates and simultaneous exposures to other infectious agents. Today the 5 worst megacities for sulfur dioxide pollution are in developing countries. More than a billion people live in urban areas with unacceptable air quality conditions.

Indoor air pollution, especially from the use of biomass or coal as fuel in poorly ventilated houses, exacts a toll in respiratory and cardiovascular ailments among the hundreds of millions in rural and periurban areas. The victims are mainly women and children, who spend much of their time indoors, particularly in the cooking area. The pollutants are similar to those that occur in urban air pollution - dust, carbon monoxide, sulfur dioxide, nitrogen oxides, and hydrocarbon carcinogens.

Surface and groundwater contamination, along with a progressive scarcity of freshwater resources that is already critical in arid and semi-arid areas, has major health effects. The diarrhoea-related deaths of 4 million infants per year and the 200 million people affected by schistosomiasis are mainly attributable to biologically-contaminated water. Chemical contamination, mainly from industrial discharges and agrochemical run-offs, has direct health effects in acute and prolonged intoxications and indirect effects through loss of food sources (terrestrial and aquatic) and deterioration of water resources. The worst-affected populations live in countries undergoing rapid industrialization, but lacking adequate environmental safeguards, where microbial contamination is still rampant and chemical contamination is increasing.

Hazardous wastes have become an increasing environmental and health problem in many areas of the world; mismanaging them results in acute and long-term exposures from contaminated air, water, soils and food. Key problems are to install controls under conditions of rapid industrialization; to assess hazards arising from the development and use of new, uncontrolled chemicals; to locate and clean up abandoned dumps, and to limit the trans-frontier movement of wastes to countries least able to deal with them.

Food contamination, biological and chemical, is a serious, world-wide health problem. Biological contaminants (pathogenic bacteria, viruses, parasites, mycotoxins, and biotoxins) cause diarrhoeal and food-borne diseases, infectious and toxic. Their sequelae, such as impaired digestion and malabsorption of nutrients, lead to malnutrition and increased susceptibility to other infectious diseases, especially among the very young, the elderly, and the immuno-compromised (e.g., HIV-infected). Chemical exposures result from agrochemical residues or indirectly through the environmental pollution of soils and pastures by toxic metals and polychlorinated biphenyls (PCBs). Some evidence of the health effects of chemical contamination of food is clear-cut, as with lead, mercury and cadmium, while others are inconclusive, due to difficulties in isolating causal factors and measuring continuing sub-acute exposures.

**Use of chemicals.** Of about 100,000 chemicals in common use throughout the world, only a small proportion have been thoroughly evaluated for their risks to human health and the environment. These chemicals are found as mixtures in several million commercial products, apart from potentially harmful chemicals produced by natural processes. Up to a million people die or are severely disabled each year from exposures to toxic chemicals, and it has been estimated that between one and four million are poisoned each year by pesticides alone. The number of chemical accidents with serious health effects is rising, again most rapidly in developing countries where chemical availability and use has expanded more rapidly than control provisions. In addition to endemic diseases with a chemical aetiology (fluorosis, veno-occlusive disease), exposure to certain chemicals may exacerbate diseases of other origins.

While the industrialized countries are challenged by new chemicals and by establishing the health effects of chronic exposure to environmental chemicals, the developing countries are likely to experience emergencies and outbreaks caused by all types of chemicals, including those considered to be controlled in developed countries. Authorities are often unaware of the chemicals contained in commercial products used or stored in local industrial establishments or transported through local communities, and few developing countries have established mechanisms to respond to chemical emergencies. Apart from poisonings, the pollution of air, water, and food has immediate and long-term health consequences. Better technology transfer and training in control methods are urgently needed.

**Occupational hazards.** In all countries, workers may be exposed to chemical and physical hazards associated with industrial technologies and workplace characteristics. About 33 million acute injuries and 150,000 deaths are reported each year, apart from some millions of cases of noise-induced hearing loss, chronic musculo-skeletal injuries, infections, and chronic diseases from exposures to dusts, metals, solvents and other chemicals. Agricultural workers are most at risk from machinery accidents, poisonings, animal-borne infections, and exposures to extreme climatic conditions, organic dusts, and diseases associated with irrigation (schistosomiasis, malaria).

**Accidents and road traumas.** Apart from major nuclear and chemical accidents (Chernobyl, Bhopal), most accidents causing death and disabilities occur in the home and in transportation; world-wide, accidents are the second leading cause of death in the 5-44 year age groups. Domestic accidents are associated with poor housing, inadequately protected heaters and stoves, lapses in child supervision, and improper siting of homes especially in squatter settlements. Inadequate provisions for first aid and emergency transportation compound the problems in poor settlements.

The World Bank has estimated that 500,000 people are killed annually in motor vehicle accidents; USA data indicate that the ratio of injury to mortality is 10:1. Two-thirds of fatal accidents involve pedestrians, many of them children; road traumas are a unique public health problem in that they selectively kill and disable young persons. The high economic costs of road traumas result from the treatment of the injured and productivity lost from premature death and disability. The problem is rising sharply in developing countries, where motor vehicle use and urban congestion are increasing rapidly.

### **Health-affecting environmental trends**

**Population and settlement patterns.** Of the world's estimated population of 5,200 million in 1989, 4,000 million (77%) were in developing countries. By medium United Nations estimates, world population is projected to rise to 6,000 million in 1998 and to 8,000 million by 2015. Developing countries' age structures and fertility rates ensure that their populations will experience most of the growth, along with increasing proportions of children and the elderly, groups especially vulnerable to environmental health hazards.

At macro levels, population stabilization is the most basic factor in sustainable development, because population growth increases pressures on resources, on the carrying capacity of local ecosystems and the biosphere, and on governmental economic and social programmes, especially when the dependency ratio of the population is high. Although biotechnology may enable the meeting of food needs through more efficient use of land, meeting other resource needs and finding ways to manage the disposal of an increased load of wastes remain intractable problems in the short and long term.

At the level of home and locality, excessive population growth translates into pressures on domestic and community economies, on physical and social infrastructure (schools, sewers, housing, health care), on land and space, and on the maintenance of a pleasant and secure style of life.

Population pressures on the environment are intensified by urbanization, which is also increasing most rapidly in developing countries. According to United Nations estimates, 38.5% of the world population lived in urban areas in 1975 and 42.7% 1990; the percentage is expected to reach 46.7% by 2000 and 60.5% by 2025. Urban populations, estimated at 2.26 billion in 1990, are expected to total 3 billion by the year 2000 (an increase of almost 30%) and 5 billion by 2025 (a further increase of 75%). The 1990 populations of Third World cities, roughly equal to urban dwellers in developed countries, are projected to multiply four times by 2025.

Urbanization is a mighty engine of environmental change, because cities are efficient in converting (hence depleting) resources into products and services. Ecosystems are altered by the city's pressures on land and water resources, its more intensive energy use, and its needs to dispose of the wastes and pollutants generated by manufacturing, transportation, and residential concentrations. The problems of meeting health protection requirements under conditions of rapid urbanization are summarized in Table 3.

Many rural environments have also suffered. Rapid urbanization and some large-scale development projects have had major ecosystem impacts on water, land and forest resources, species destruction, and climate. Desertification, erosion, and the mining of forests have undermined the natural resource base, while urban migration has sapped the human resource base of many rural communities and economies.

**Poverty and underdevelopment.** Poor health is closely associated with impoverished living conditions, and poverty intensifies the stresses of rapid population growth and urbanization on the environment's capacity to sustain life and health. In their struggle to survive, poor people inevitably put pressure on the



TABLE 3

## ENVIRONMENTAL FACTORS IN URBAN HEALTH

HEALTH PROTECTION/PROMOTION REQUIREMENTS IN HUMAN SETTLEMENTS	COMMON SHORTFALLS UNDER CONDITIONS OF RAPID URBANIZATION	ADVERSE HEALTH EFFECTS
Environmental management to provide water, protect public spaces, remove excreta and other wastes, and protect air and water quality	Increased complexity of problems; greater needs for capital investment to effect economies of scale and proximity; limited ability to anticipate, prevent and abate pollution and changes in conditions that foster disease	Continued or increased exposures to disease pathogens and toxic agents
Cooperative action, often by government, to provide appropriate infrastructure and services	Outstripping of economic growth and community capacity by rapid population growth and/or absent or delayed responses to needs	Limited capacity for health protection actions
Controls over land use to ensure protection of human and property rights, reduction of industrial and transportation hazards to residences	Inadequate decentralization of powers to local governments and to citizen groups	High exposures to pollutants and physical hazards of wastes; more risks of accidents, floods, mudslides; more vector-borne disease
Housing adequate to provide decent shelter and avoid disease, social and psychological problems	Inadequate planning and regulation to prevent improper siting and to control pollution; inability to prevent settlements in flood-prone and other hazardous locations; more vector breeding	High incidences of air-borne infections, enteric diseases, accidents, mental illness, violence and crime
Employment opportunities, reasonable incomes, and protection of workers against occupational hazards	Inadequate and often decaying housing stocks; overcrowding and increased physical health hazards; increased numbers of homeless and "street people"	Physical and mental diseases associated with poverty
Provision of education, health and social services	Lags in "formal" sector employment availability; enlargement of the unregulated "informal" sector and increase of an economic underclass	Inadequate self-help and assisting help to prevent illness and promote health
Opportunities for social participation, recreation, and enjoyment of nature and culture	Inadequate provisions, especially for the poor and those in "illegal" settlements; too little Primary Health Care and hygiene education; intensification of underclass lifestyles	Prolongation and worsening of adverse conditions; social alienation and depression
	Weak stimulation and support of neighbourhood and civic organizations and activities, resulting in over-reliance on government; shrinking of the community's resources and cooperation patterns	

bearing capacity of land, water and air resources; at the same time, they are the least able to withstand the physical and psychological stresses that their lives entail.

Poverty, the inability of an individual or household to maintain a minimum standard of living, is often associated with severe economic discrepancies between groups of countries and between population segments within countries, both industrialized and developing. Using income criteria, 881 million urban and rural dwellers in developing countries lived in extreme poverty in 1985; using lack of access to safe drinking water as a poverty criterion, the number was about 2,200 million. In industrialized countries, the urban poor are generally a small, but growing, minority who suffer the effects of deprivation, while sharing with their more affluent neighbours the ills of toxic pollution, congestion, noise, and the effects of deteriorating physical infrastructure. In developing countries, the urban poor are not only more numerous, but their exposure to natural and man-made environmental hazards is generally more severe.

Meanwhile, community poverty makes it more difficult for these countries to meet infrastructure needs or to exercise environmental protection controls. Over the last decade, faltering progress on improving health indicators - sometimes loss of ground - accompanied stagnation or deterioration in many national economies. Itself an environmental factor, underdevelopment exacts a heavy toll in disease and death.

**Increased resource use.** Conversely, as increased demand drives economic development, convertible resources are being depleted and the basic resources of air, soil, and water are contaminated by rising levels of wastes, contributing to adverse changes in the biosphere. The problem has several aspects.

High consumption economies. The populations of industrialized countries, using highly developed technologies and with relatively high incomes, make disproportionate demands on world resources and generate a disproportionate share of wastes. While their average caloric intake is half again as great as that of developing countries, their average consumption of many other resources is 10 to 20 times as great. Their per capita demand on food resources is higher also, because livestock products form a large element of their diets. Excessive use of non-renewable resources - notably fossil fuels for energy generation, transport, heating/cooling and manufacturing - undermines sustainability. Although recycling and other conservation practices can ameliorate some resource drains and reduce the volume of disposed wastes, the tendency of consumption to increase with development highlights the need to modify production and consumption patterns in order to enhance ecosystem and resource sustainability in all countries.

Intensive land and water development. To satisfy growing demands for agricultural and industrial products, energy and housing, land and water resources are increasingly subjected to various forms of intensive development and management. While these processes are the basis for improving the quality of life and increasing prosperity, they have had serious negative health effects, often not anticipated or mitigated in time. Topsoil, freshwater reserves, stable climate, and the ecosystem diversity and carrying capacity - built up over millennia - can be degraded by cultivation and land use practices. Coupled with the reduction of wetlands and pollution of aquatic ecosystems, these changes threaten the meeting of future requirements for food, biomass fuels and forest products, quite apart from the alterations induced in vector populations and in the habitats of natural enemies of pests. In the short term, they lead to economic stagnation, commodity shortages, nutritional deficiencies, and increased communicable diseases. In extreme situations, people have become "ecological refugees".

Industrial, energy, and agricultural development. In many countries, growth in manufacturing, mining, power generation, motorized transport, and large-scale agriculture has been implemented without adequate safeguards to protect health and the environment; commercial energy production and motor transportation make significant contributions to the accumulation of greenhouse gases and airborne acidic substances. Extreme incidents, such as the Bhopal catastrophe in India and the Chernobyl accident in the USSR, are only a small part of the problem, which is marked by accumulating emissions from millions of sources.

Pollution from small village industries as well as large industries is increasing. Environmental and health problems are created when hazardous industries are located in or near residential sections and when shantytowns are settled around industrial plants.

Misuse of chemicals in large-scale agriculture creates threats to users, consumers, and ecosystems. Inadequate management of hazardous industrial wastes increases local exposures to pollution, impacts the food chain, and has other ecosystem effects. Adding to the local waste burden of developing countries, hazardous wastes have been exported there from developed countries, often to be deposited in dumps without appropriate safeguards.

Worker protection provisions differ among countries; International Labour Organization data show that developing countries may have up to 10 times the occupational injury mortality rates of typical industrialized countries; the large numbers working in the "informal" (hence unregulated) economy are at special risk.

**Macroeconomic policies.** Public policies on, for example, trade, financing, land and water use, local government powers, taxation, and pricing, may guide development in ways that have adverse consequences for health and environmental preservation. Such policies are often driven by strictly economic values and measured only by economic criteria, to the exclusion of social and environmental considerations. In countries with "structural adjustment" policies, which are accepted as necessary conditions for economic stabilization, special care is needed to avoid dangerous environmental abuses, inequitable distribution economic penalties, and the harming of groups most vulnerable to the adverse short-term effects of development activities.

**Transboundary and global trends.** All these trends contribute to international and macro-environmental problems. Although concerns about long-term effects predominate, some trends pose current regional threats and immediate hazards to health. Those that require strong preventive and control measures through international studies, agreements, and programmes that give proper consideration to their health implications include:

- the long-range transmission of acidic and radioactive pollutants, affecting aquatic life and forest and land resources;
- inter-country movements of hazardous products and wastes, often poorly controlled;
- stratospheric ozone depletion that increases exposures of humans and other biota to harmful ultraviolet radiation;
- climate change, mainly from urban heat concentrations, massive forest depletion and the build-up of greenhouse gases, which induce aberrant regional effects (such as temperature inversions) and long-term threats of altered vector breeding patterns, disruption of agricultural production, and loss of urban and land resources; and
- loss of biodiversity through often unknowing extinction of species, including those currently and potentially valuable to humans and those essential to ecosystem balance. {Species presently and potentially useful to medical science and treatment should be protected, but the ensuring of biodiversity should not inhibit efforts to eradicate such pathogens as the HIV and polio viruses, the Guineaworm, and the *plasmodium falciparum* of malignant malaria.}

## **Country capabilities for environmental health protection and promotion**

Another dimension of the problem is the capability of countries to protect their people against environmental hazards to health, to promote health through preventive and supportive actions, and to engage in efforts to protect their own and the global environment.

Most developed countries have greatly expanded their capabilities for protection against pollution in the last two decades, even though political decisions on economic development sometimes disregard alternatives that support better environmental conditions for health. Most developing countries, however, are ill-prepared either to take preventive actions in their development planning or to reduce existing environmental health problems. They lack technical and monetary resources, an adequate institutional base, trained manpower, and sufficient information about the hazards and risk involved. Low national economic status correlates with inadequate capabilities, and risks are especially severe in countries where low national income coincides with aggressive industrial and agricultural development.

A 1989 WHO survey of national capabilities found that only 10 of 136 developing countries substantially met key requirements for effective protection against adverse environmental factors. Most countries were weak in the basic environmental health categories, leaving hundreds of millions of people without provisions for water supply, basic sanitation and food safety. These countries were even weaker in controlling air quality, ionizing radiation and toxic chemicals. Few countries have adequate legislation, enforcement of norms, assessment capabilities, standards and regulations, or the ability to forecast the health impact of development projects. Most lacked adequate staffing (especially at local levels), effective mechanisms for intersectoral action, and adequate financing - or even strategies to overcome these limitations.

In many countries, both developing and industrialized, the health authorities were weakly involved in sectoral and intersectoral efforts to protect people against environmental risks to health. Most were ill-prepared to perform the environment-related functions of their public health mandate or to contribute needed health information and insights to development planning, environmental management processes, or community action to promote health through better socioeconomic and environmental conditions.

## CHAPTER 3. POLICY APPROACHES FOR HEALTH-ENVIRONMENT STRATEGIES

### The need for health-environment strategies

A broad array of actions is required to solve health-environment-development problems, to reduce their present toll, and to avert their foreseeable adverse consequences. For those actions - many connected with discrete categories of environmental expertise - to be effective, strategies must integrate and balance activities. Fragmentary, isolated and contradictory undertakings are no longer tolerable. Health should be approached holistically - preferably as part of country strategies for sustainable development called for in Agenda 21, the long-range action document adopted at the June 1992 United Nations Conference (UNCED) in Rio de Janeiro.

Apart from shared global and transnational problems, each country - and its regions and localities - faces a distinct configuration of needs. Each such community also has a distinct array of values, resources, customs, and institutions that determine what solutions are feasible, what choices are preferred, and what cooperation with others might be undertaken.

Because of these differences, **an overall global health-environment strategy is a necessary but not a sufficient response. Strategies appropriate to each country and community are also required;** in some cities, distinct strategies may be needed in different zones and neighbourhoods.

But if such separate strategies are not to defeat one another, **international, national and local strategies must be harmonized.** Improving the squalid conditions in shantytowns can seldom be isolated from national macroeconomic policies. Management of hazardous waste may involve not only different local jurisdictions, but sometimes international agreements, as well. And ultimately local actions increase or help reduce problems like global climate change.

The key to serving global objectives while responding to local variations, as well as reconciling the need for autonomy with the need for impact, is to **base strategies on shared principles and criteria, rather than on uniform or universal standards.** Because, at all levels, the environmental factors in health improvement involve so many actions by so many people, a totally managed system is unrealistic. Instead, strategies must influence people's actions by encouraging them to accept shared values and goals, whether the "people" are regulatory agencies, businesses, households or farmers.

### Shared principles for health-environment strategies

Existing knowledge about health-environment interactions support the following policy and programming principles:

1. **Safeguarding the integrity of the natural environment, through actions for sustainable development, serves human health needs.** Policies should ensure that the environment's capacity to support human well-being over the long term is not impaired, specifically with respect to the quality of air, water and soils, protection of the atmosphere and oceans, non-renewable natural resources, and the preservation of species other than pathogenic microorganisms. Restoring damaged environments, limiting pollution, and preserving natural elements in human settlements contribute to meeting health needs.

2. **Cooperative planning and action, oriented to the prevention of health and environmental problems and involving all levels and sectors of human communities, is integral to Health for All policies and the key to sustainable development.**
3. **Socioeconomic development and welfare policies should**
  - **balance long-term and current needs for environmental exploitation, meanwhile ensuring that all people's basic needs are met,**
  - **introduce new technologies and changes prudently, considering the full range of interests to be served, especially the health of humans serving and served by socioeconomic development,**
  - **be based on sound scientific knowledge, including behavioural and social sciences, so as to foster efficient and equitable use of natural and social resources,**
  - **emphasize the prevention of adverse effects, as well as remedying invidious conditions, and**
  - **elicit wide participation.**
4. **Scientific knowledge and technology should be freely shared among countries and widely disseminated within countries; shared agendas should guide national and international research into needed knowledge and methods.**
5. **Within countries, action responsibilities (and necessary powers) should be appropriately decentralized to households, enterprises, and communities; acceptable institutions should stimulate, support and harmonize cooperative efforts. Primary Environmental Care activities should be a fundamental element of strategies, and the sustainability of development should be strengthened through a structure of incentives and controls that take account of economic, social and cultural factors of the community.**
6. **Strategies should provide the policy framework and institutional means to coordinate the intrinsic power of specialization. Many health-environment problems can be solved only by applying the knowledge and expertise developed over centuries through the various categories of science, technology, and management; but categorical contributions will serve best when subject to an overarching systemic approach. Likewise, finding the new knowledge and devising the new methods that are needed should be pursued both within disciplines and through interdisciplinary research. Parallel needs exist in the sphere of practice, where the task is to harness the benefits of sectoral expertise - whether in epidemiology, engineering, education, or animal husbandry - to the service of larger, shared objectives.**
7. **Building adequate national and community capacity to prevent and control environmental problems and issues should be an explicit target of strategies. Such capacity includes the technical capabilities of institutions, effective mechanisms for cooperation, and - fundamental to all - public awareness of problems and knowledge of the actions that are required. Broadening the environmental health role and functions of health agencies and professionals, and ensuring their capabilities to collaborate with other sectors and organizations, is essential.**

## **Intersectoral cooperation in health and the environment**

The themes that permeate these principles are **cooperation, participation, decentralization and harmonization**. These themes recognize that human well-being in sound environments cannot be achieved by "top-down" directives alone, nor by hoping that salvation will spring from "bottom-up", nor by blind faith that isolated actions in separated sectors and organizations will somehow solve increasingly complex problems. They recognize also that virtually no person or organization on the planet is without a stake and a role in solving these problems.

Mobilizing communities for action has become essential. Doing so, however, faces formidable obstacles in prevailing organization and practice patterns, the attitudes that underlie those patterns, and insufficient awareness and concern.

The need to overcome such obstacles has been recognized for a decade or more in development circles, official and voluntary. The established term for the means to meet this need is "intersectoral cooperation and coordination". The term's usefulness depends on how broadly it is interpreted and implemented. When intersectoral cooperation is understood to pertain only to government departments, implemented solely by organizing a high-level (inactive) committee, or as one-way support to a sector's programme, it falls short.

Properly interpreted and applied, intersectoral cooperation and coordination means that:

- the problems tackled are common ones, in which all participants have a stake;
- a sector includes not only governmental agencies, but all public and private organizations, clienteles, and interests that are active in the sector;
- policy-makers, technical and service staffs, and volunteers - at national and local levels - have actual or potential functions to perform;
- with respect to specific issues, various participants may play leading and supporting roles;
- cooperation consists not only of ratifying proposals, but also participation in defining issues, prioritizing needs, collecting and interpreting information, shaping and evaluating alternatives, and building needed capabilities for implementation; and
- stable cooperative mechanisms are established, nurtured, and revised according to experience.

In most countries, it is primarily government that must take the lead in promoting a wide, pervasive system for intersectoral cooperation, both by putting its own house in order and by actively stimulating, sponsoring, and supporting action by private organization and persons.

A healthy population - a prime goal in every society - requires the successful management of interdependencies, whether through market mechanisms or regulation. To meet the health need of adequate nutrition, for example, most people depend on social mechanisms made up of farmers and fishermen, food processors, chemical suppliers, brokers, marketers, transport drivers, agricultural agents, and various inspectors, apart from favourable conditions in the natural environment. Interdependencies increase when social environments become more complex or natural environments are overly exploited, as localized short-falls in food supply have demonstrated.

**Health is thus a prime subject for intersectoral cooperation, especially in preventing disease, injury, and death from environment-based causes and in promoting positive health states by improving environmental conditions and interactions.**

Bringing about positive changes in health-environment outcomes requires meshing the efforts of many actors, who are organized in overlapping social systems (i.e., communities). Those actors - governmental, private, entrepreneurial, domestic, collective, individual - are to some degree autonomous.

In the governmental sphere alone, health-environment decisions are taken by authorities in agriculture, industry and labour, housing and public works, water supply, sanitation, planning, transportation, education, communications, public safety, recreation, social welfare, energy generation, forests and fisheries, environmental management, and, of course, public health. The need for cooperative action pertains not only to the national level of government, but to all levels. The needed intersectoral and intergovernmental working relationships can be hindered for many reasons - sometimes because a sectoral ministry has no local units, sometimes because vertical linkages are ineffective, sometimes because of a lack of policies or incentives to overcome isolationist tendencies on the part of each such authority.

Actions by these authorities' counterparts in private or state enterprises may affect health even more than governmental actions, especially when they fall outside of government's purview, as with small enterprises that are beyond the regulation or even the cognizance of governments. Further, individual actions - reproductive behaviour, occupational and domestic practices, consumption patterns, automobile use - react to the living environment and induce changes in it.

Properly guided, a coherent pattern of decisions and actions can optimize health-environment relationships, so that a decent quality of life may be preserved and prolonged, illness and injury averted, and productive contributions made to the community and its members. Lacking such coherence, the community is burdened, on the one hand, with the direct costs of preventable disease, avoidable injury and premature death and, on the other, the indirect costs of depleted social wealth and development potential.

#### **Public health and health sector functions**

Government health authorities have a pivotal role to play in the establishment and operation of networks to improve health-environment conditions. This role is rooted both in sectoral expertise and in the mandates for overall community health oversight stated in the constitutions and statutes of many countries and states. Although some public health agencies have not been prominently involved in environmental health protection (Chapter 2), the question has risen anew, because of increasing public and governmental concerns about environmental issues, their implications for medical care costs, and their relationship to the health promotion movement. The 45th World Health Assembly (1992), for example, called upon all WHO Member States to reconsider health sector capabilities and functions in environmental health.<sup>1</sup> Redefining or clarifying health sector functions in complex health-environment systems has become an urgent task.

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<sup>1</sup> Resolution WHA45.31 calls for, *inter alia*, "the reorientation of environmental health work so that it meets health-for all needs through intersectoral, interdisciplinary approaches to development; the institutionalization of these approaches through appropriate changes in structures and functions within the health sector, bearing in mind activities in other sectors and the community; [taking] action to improve environmental conditions for human health through measures for health protection, health promotion, and community participation; the development of techniques and the strengthening of skills in public health services and related agencies to improve the analysis of...problems and the implementation of effective interventions...."



The broad mandates of public health agencies do not imply, with respect to environmental factors, that these agencies are to assume responsibility for the operation of environmental controls. Instead, their primary duty is to help ensure that the activities of all sectors and organizations contribute positively to health protection and promotion. Thus, the key elements of the health sector's role are:

- **partnerships** that relate health units to the many governmental, business and public entities involved in health-environment interactions, so as to promote interdisciplinary, intersectoral, intergovernmental, and community action for health;
- **advocacy and representation**, based on epidemiological surveillance of the health situation, to raise people's awareness and understanding of problems, to elicit the participation of organizations and communities in health promotion, and to ensure that health implications are considered when environmental changes are contemplated and undertaken;
- **health risk assessment**, to provide information that interprets the health implications of monitoring data and development proposals, especially in environmental impact assessments and in establishing regulations to control health hazards; and
- **technical support and guidance**, in setting objectives, proposing and evaluating alternatives, planning interventions, training staffs and volunteers, and evaluating needs and programmes.

Essential health sector functions can be divided between those in which health authorities would take the lead and those of a supportive nature. A detailed statement of those functions appears in Box 1.

**HEALTH AUTHORITY FUNCTIONS IN  
ENVIRONMENTAL STRATEGIES FOR HEALTH**

**Leadership functions**

1. **to advocate preventive measures** to protect the public's health, by representing health considerations in the formulation of public policy; increasing the awareness of related ministries, private enterprises and the public about environmental health issues; and otherwise encouraging behaviours and environmental modifications with positive health impacts.
2. **to foster community capacity to manage health-environmental interactions**, including preventive and remedial measures, by strengthening the ability of local authorities to carry out decentralized functions, encouraging initiatives in the private sector, and supporting the development of community self-help programmes and family skills.
3. **to carry out health impact and risk assessments**, based on adequate monitoring, to identify threats to health from existing environmental practices and conditions and from proposed changes relating to land use, settlement, shelter, occupation, industrial processes, energy generation, water resources, etc.; such assessments should entail evaluation of the health implications of environmental data that may originate in monitoring activities of other agencies.
4. **to conduct epidemiological surveillance of environment-related diseases**, informing decision-makers and the public about the situation and trends in community health states with respect to environmental hazards.

**Advisory and participative functions**

5. **to train personnel to identify, prevent, and control environmental hazards to health**, including public health and medical staffs, personnel in such other sectors as agriculture, industry and labour whose duties enable them to affect safety conditions and the use of chemicals, community-based auxiliaries and volunteers, and - with respect to actions within the domestic sphere - the general public.
6. **to establish and operate environmental control programmes and services**, including those assigned to ministries of government, those carried out through intersectoral and intergovernmental mechanisms, and those conducted through public-private networks of community groups.
7. **to develop and implement interagency emergency response capabilities** for natural disasters and accidents, including capabilities for medical treatment of disaster victims.
8. **to collaboratively develop norms, standards, and legislation**, providing necessary scientific and technical information, advisory resources, and assistance to legislative and administrative leaders in the drafting and review of proposals.
9. **to incorporate evaluations of health implications as integral elements of socioeconomic development and planning**, emphasizing the prevention of environmental hazards arising from development projects, as well as promoting grass-roots capabilities for social development and environmental improvement; health evaluations should be required routinely in **environmental impact assessments**, and the execution of development projects should be systematically monitored to ensure health protection.
10. **to charter and carry out research** into environmental health and health-related environmental problems, conditions, and intervention methods.

## CHAPTER 4. ELEMENTS OF NATIONAL AND LOCAL STRATEGIES

### Orientation, general objectives and global priorities

The changes in health-environment conditions described in Chapter 2 make clear the need for localities, countries and international organizations to redefine their strategies for health in relation to development. Agenda 21 (described in Chapter 3) recognized this need as urgent, both because certain environmental conditions are worsening, and because environmental factors increasingly determine health outcomes.

Despite national and local differences, certain generalizations pertain to: (1) problems that transcend national boundaries; (2) problems that are similar in countries at parallel stages of development or which have common ecological and cultural characteristics; and (3) problems found in all countries even though in different forms and distributions.

The following sections, which discuss common elements of health-environment strategies, are based on two main sources: *Our Planet, Our Health; Report of the WHO Commission on Health and the Environment* and Agenda 21<sup>2</sup>. Because the activities in Agenda 21 which focus on health have been concentrated in Chapter 6 - Protecting and Promoting Human Health, this document has used that chapter as the basis for the discussions and presentations. But, as presented in Table 1, it is recognized that important health activities are contained in other Agenda 21 chapters, e.g. Chapter 19 - Environmentally Sound Management of Toxic Chemicals, Chapter 7 - Promoting Sustainable Human Settlement Development, and Chapter 18 on Freshwater.

The WHO Commission has stated three broad goals to be sought through health-environment strategies.

### Global objectives

1. **To achieve a sustainable basis for Health for All**, requiring a slowing down and eventual halt to population growth and, especially in the industrialized countries, the adoption of consumption patterns consistent with ecological sustainability.
2. **To provide a health-promoting environment for all**, whose quality protects against hazards and ensures that all have the means to acquire the resources on which health depends.
3. **To enable individuals and organizations to fulfill their responsibilities in attaining health for all in a sound environment**, emphasizing equity and participation as principles to guide planning and action.

Agenda 21's chapter on "Protecting and promoting human health" identifies priority programme areas that address major unmet health needs and adverse environmental conditions. These apply in most countries, developing, industrialized and those rapidly changing their political and economic systems (as in Eastern Europe and Northern Asia).

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<sup>2</sup> Additional sources include other relevant documents from the UNCED, reports of a number of WHO Expert Committees that met in recent years, the European Charter on Health and Environment, pertinent technical discussion reports and resolutions from several World Health Assemblies and WHO Regional Committees, and the Sundsvall Statement on Sustaining Environments for Health.

1. **Meeting primary health care needs**, particularly in rural areas and including safe food, clean drinking water, and adequate sanitation.
2. **Control of communicable diseases** transmitted through the physical and social environments.
3. **Protecting vulnerable groups**, especially women, infants and children, youth, and indigenous people.
4. **Meeting the urban health challenge**.
5. **Reducing health risks from environmental pollution and hazards**.

Table 4 summarizes the major elements of each and describes the typical problem configurations found in developing and industrialized countries.

These programme areas overlap and interlock. Without meeting basic health needs little progress can be made in the other categories; the urban health challenge includes problems in the others categories, as does the protection of vulnerable groups. Moreover, as Table 1 demonstrated, all five are inseparably linked with, and dependent on, the various social and environmental factors addressed in all substantive chapters of Agenda 21. In this sense, the action programme emerging from UNCED is entirely about human health, and health objectives must be integral to national strategies for sustainable development.

### **Formulating strategies**

For health-environment-development strategies to be appropriate to a country or locality requires not only that they take account of distinctive problems, resources and values, but also are formulated in ways that are compatible with community characteristics. Traditions, conditions and social structures will lead, in some countries, to a "bottom-up" pattern of local initiatives that stimulates the development of national norms, while in others, national guidelines will provide the starting point. Strategy formulation can be a comprehensive and rationalized process in some places, but an incremental process, which starts with a segment of the total problem spectrum, will better fit the situation in others. Whatever the circumstances, however, it is essential that: (1) the process involves all appropriate participants; and (2) the process, each of its steps, and the product (the strategy) is open to progressive change and revision, as experience is gained, as new information is acquired, and as new opportunities arise.

The latter point means that the process, which is customarily thought of as linear - moving forward from step to step - will actually be circular: what is learned along the way will induce a revision of preceding decisions. For example, the initial perception of the problem situation will suggest which agencies and interests should be involved in the strategy formulation; when those participants interact, however, changed perceptions will likely emerge, making it necessary to revise the participant list. In the same way, close examination of budgetary assumptions may raise the need to revise time and quantity elements of the objectives that were set earlier.

**Setting and participants.** Formulation of strategies may occur at any level, from neighbourhood to nation. The setting - the focal community - determines the scope of the strategy (the problems to be considered), the characteristics of the information that will be relevant, what alternatives are feasible, the participants to be involved, how formal or informal the process is to be, and the extent of supports and guidance that is likely to be available. An autonomous, indigenous neighbourhood effort will be simpler, more direct, and more informal than a concerted formulation process, which might be city-wide or national-regional-local in scope. Large-scale formulations present possibilities for economies of scale in information pro-

cessing and procurement unlikely to be found in autonomous local efforts; however, losing or ignoring data on local variations should be avoided.

Higher-level, concerted, and wide-ranging formulations usually involve complex arrangements for participation and communication, and issues of intergovernmental, intersectoral, and public-private relationships often have to be resolved. Such issues are interrelated and will arise in different forms in unitary, federal, and confederated countries. Typical issues to be resolved are illustrated in Box 2.

**Problem definition and analysis.** The identification of problems to be addressed is the critical step in the formulation process, because it shapes all the following steps. The selection of certain problems immediately gives those problems a priority over all others and sets the boundaries for what will be attempted (objective-setting), the lines of action to be undertaken, and the resources to be developed.

For environmental strategies for health to address actual community problems, the collation of information contributed by various participants is but the first step. Such information must be processed, through synthesis and discussion, to develop a consensus that reconciles different perceptions of needs and priorities, distinguishes between symptoms and causes, and develops a shared commitment by all participants to the shared problem definition. For example, people in poor and middle class neighbourhoods of a city may have differing views of the most urgent problems; so long as those views fit within the scope of local concerns, all views and relevant data should be accommodated, rather than letting city-wide statistics mask true differences.

In most instances, the problem categories in Agenda 21, highlighted above, provide a relevant starting point to identify needs and set priorities, affecting specific populations and communities. Communicable disease patterns in rural areas, for example, may differ significantly from those in cities, and a city in an industrialized country may be more concerned with socially-communicated diseases than with parasitic infections of major concern in a Third World city. Communities where mining and chemical production occur will define chemical safety issues differently from those where the hazards derive mainly from use, storage and transportation. When needs cannot be identified from available statistics, surveys and canvasses may suffice.

TABLE 4

## AGENDA 21 PRIORITY PROGRAMME AREAS: BASIC DESCRIPTION

PROBLEM/PROGRAMME ELEMENTS	TYPICAL NEEDS IN DEVELOPING COUNTRIES	TYPICAL NEEDS IN INDUSTRIALIZED COUNTRIES
<p><u>Meeting basic health needs</u></p> <p>Provision of safe food, adequate nutrition, clean drinking water, adequate sanitation, suitable shelter, and primary health care, in the context of health-for-all systems</p>	<p>Many people, a majority in some countries, lack these basic provisions, because of relative economic and technological underdevelopment; reciprocally, poor health states undermine the human resource base for sound development</p>	<p>Shortfalls, while less extensive, affect growing minorities of the poor and homeless, impacting children excessively; many localities need to restore decaying physical infrastructures; population shifts induce unmet regional needs</p>
<p><u>Control of communicable diseases</u></p> <p>Water-related, vectorborne and contact infections take an excessive toll of mortality and morbidity; environmental controls and hygiene education are primary preventive measures for non-immunizable diseases</p>	<p>Especially in tropical areas, these account for most deaths and illness; environmental controls and hygiene education are weak and coverage is incomplete, as is the case with immunization measures in some countries</p>	<p>Maintaining community immunization protection is a continuing concern, as are infrastructure breakdowns; increased sexually-transmitted and immunodeficiency diseases, with pathogen resistance to chemotherapeutic agents</p>
<p>Social factors affect the "communication" of addictive and sexually-transmitted diseases, including HIV infections</p>		<p>Health statistics indicate that exposures to environmental risk factors are unevenly distributed among population groups according to gender, ethnicity, citizenship, residence and economic status</p>
<p><u>Protecting vulnerable groups</u></p> <p>Environmental health hazards disproportionately affect certain population groups because of their biological or social vulnerabilities:</p> <ul style="list-style-type: none"> <li>- infants and children</li> <li>- youth</li> <li>- women</li> <li>- indigenous peoples</li> </ul>	<p>Infant, child, and maternal mortality rates remain high in most countries because of malnutrition, exposures to unhygienic conditions, low levels of education, and sexual and economic exploitation</p> <p>High stress levels and the weakening of traditional support systems occur in countries undergoing rapid economic and social change; women's status, health and educational levels remain low</p>	<p>Changing social practices increase such health problems as sexually-transmitted diseases, teenage pregnancy, substance abuse, accidents, and depression</p>
<p><u>Meeting the urban health challenge</u></p> <p>Dealing with a spectrum of problems, including poor living conditions and lacking services; intensified health hazards from overconcentration, pollution, inadequate infrastructure, and weak environmental management; and adverse effects on the natural environment and resource base needed for sustainable development</p>	<p>Rapid urbanization, especially in "megacities", subjects hundreds of millions to extensive health hazards; conditions are sub-marginal in numerous squatter settlements and among the homeless; growth outluns community capacity to provide infrastructure and basic environmental and social services</p>	<p>Economic and demographic shifts have led to major deterioration of central zones of some cities; mounting numbers of poor and homeless, along with decaying infrastructures, tax financial capacities; increasing problems of pollution control and waste management</p>

TABLE 4 (continued)

PROBLEM/PROGRAMME ELEMENTS	TYPICAL NEEDS IN DEVELOPING COUNTRIES	TYPICAL NEEDS IN INDUSTRIALIZED COUNTRIES
Reducing health risks from environmental pollution and hazards		
Biological, chemical and physical pollutants contaminate air, soil, and surface and ground waters and adversely affect health, acutely and chronically, directly and indirectly; production and transportation processes, as well as products and wastes, are implicated in hazardous exposures and accidents	Development has added new, complex chemical and physical pollution hazards to long-standing (sometimes worsening) problems of biological pollution and indoor air pollution from the burning of biomass and coal; rapid population growth and concentration intensify and widen adverse impacts	Despite notable improvements in some countries, high consumption and waste generation continue the deterioration of the environment and the natural resource base; economic policies often conflict with environmental preservation; potentials for more efficient use of resources are not realized
Pollution affects human and other life forms at all levels from the biosphere to the workplace and homes	Misuse of pesticides and other chemicals, urban air pollution, inadequate solid and hazardous waste disposal, road accidents and occupational hazards are frequent problems, made worse by inadequate controls resulting from financial, technical and human resource shortfalls; lack of technology impedes prevention of pollution and efficient use of resources	Some countries have massive clean-up needs; lack of ecological absorption capacity leads to exportation of polluting wastes
Preventive and abatement measures, based on monitoring, require action by producers and consumers (including alterations in consumption patterns) under community norms and guidance		

## BOX 2

### ISSUES OF MANDATES AND PARTICIPATION IN ENVIRONMENTAL STRATEGIES FOR HEALTH

#### Intergovernmental issues:

- the role and interrelationships of political bodies and their supporting units at each level;
- vertical communications between sectoral agencies at different levels in relation to "horizontal" coordination at each level;
- arrangements for involving private organizations;
- differences in the role of various localities (hamlets and villages, cities, inter-urban agglomerations); and
- the distribution of functions and responsibilities to each level, including powers of taxation, pricing and borrowing.

#### Intersectoral issues:

- decision-making and collaborative structures for policy-making, planning, regulating, and programme operations, including arrangements for information exchange and such support arrangements as research and development work by universities, etc.;
- patterns of delegation and decentralization within those structures;
- assignment of functional responsibilities to sectoral and cross-sectoral entities, as for training, emergency preparedness;
- coordination and monitoring of intersectoral activities and resources; and
- coordination of public information and rules for cross-sectoral communications to governmental units and private organizations associated with the respective sectors.

#### Public/private relationship issues:

- determining and choosing among alternative entry points and start-up activities;
- stimulating the organization and supporting the activities of community action entities;
- negotiating agreements on cooperation with private enterprises and organizations;
- relating inter-city networks (e.g., Healthy Cities/Communities) to local decision-making;
- rules and procedures for private participation in or contribution to governmental decision-making; and
- specifying functions (and education to enable contributions) of
  - householders
  - community action participants
  - community organizers, trainers, facilitators
  - producer and service organizations, investors in enterprises
  - managers of governmental and private organizations.

Beyond health and environmental needs, however, strategies should take account of the "instrumental" problems of insufficient capacity to improve the situation: lack of technical or planning capabilities, barriers to the participation needed to implement the strategy, inadequate information and human resources, legal limitations, financial shortfalls and maldistributions, and technological deficiencies.

To be realistic, problem definitions should also take account of two sets of factors outside the focal community. Firstly, how that community's health and environment are affected by extra-community elements, be they "upstream" pollution, poor roads, weak import controls, national macroeconomic policies, or the international narcotics traffic - that is, how external factors contribute to the problem. Secondly, how external factors limit the community's capacity to respond, whether because of governmental centralization, foreign exchange shortages, political instability, weak support to education, traditions that discourage participation or innovation, inadequate training and research institutions, weak development policies and controls, lacking or hampering legislation and standards, low national income, and weak scientific and information bases.



## Modes of action

Specific actions to attain the priority objectives identified previously, which are illustrated in Box 3<sup>3</sup>, can be classified into a smaller number of categories. These categories are not closed compartments; their elements may be combined, so that actions can be mutually reinforcing or, if improperly selected, can cancel one another out. Desired householder behaviours, for example, can be encouraged or discouraged, not only by educational messages, but also by whether taxes, fees and subsidies are applied or not. The health benefits of investments in water and sanitary systems can be buttressed by user education and provisions for keeping the systems operational. Well-structured intersectoral cooperation and wide participation decreases the probabilities of inconsistencies, inadequacies and contradictions.

**Economic incentives and disincentives** (through taxation, pricing, and marketing rules) can discourage waste generation, pollution, overuse of resources, improper siting of industries and settlements, and exploitation of vulnerable groups. They can encourage investments in infrastructure and training, efficient production processes, homebuilding and renovation, resource conservation, and minimized generation and proper management of wastes.

**Regulation**, backed by criminal and financial penalties, defines and applies standards for producer and consumer behaviours, substance production and use, product safety and marketing, resource exploitation, and environmental and human protection. Regulation is most effective when it has a sound scientific basis and, by bringing concerned parties together, considers all relevant aspects of regulated actions.

**Planning**, through comprehensive assessment of proposals and alternatives, can prevent environmental abuses and consequent hazards to health and can define the desired future conditions that are to be sought through public and private actions.

**Eliciting individual action** promotes cooperation in a broad range of actions that supports environmental preservation and restoration, such as waste disposal practices, recycling and reuse, energy and product conservation, reducing and cleaning up litter, restricting overuse of motor vehicles, taking safety precautions, avoiding hazardous and addictive substances, improving shelter provisions, and following hygienic and health-promoting lifestyles. Public information and education are essential requirements.

**Promoting community action** reinforces and extends the sphere of individual and family action by identifying needs, devising responses, strengthening educational messages, pooling and mobilizing resources, gaining access to expertise, promoting individual and group responsibility, and increasing people's social capabilities.

**Providing services and infrastructure**, to serve general community needs and the needs of disadvantaged and underserved populations, can reduce environmental stresses and hazardous conditions, prevent diseases and injuries, strengthen protective measures, support community action, and foster socioeconomic development. In addition to (and sometimes replacing) provisions by governments, private and community efforts may contribute to these ends.

**Legislated rights and responsibilities**, in statutes and local laws, establish norms for acceptable living conditions, proper behaviours with respect to the natural and social environment, responsibilities for private and governmental actions, and basic rights to protection. Legislation also empowers governmental and private actions to implement environmental strategies for health.

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<sup>3</sup> See also the "Preventive and Remedial Actions" column of Table 2.

### ILLUSTRATIVE ACTIONS TO ATTAIN AGENDA 21 PRIORITY OBJECTIVES

#### Meeting basic health needs, by

- using Primary Health Care approaches to meet needs for clean water, safe food and sanitation, linking PHC with Intersectoral Primary Environmental Care initiatives,
- implementing affordable approaches to providing essential health and social services, including pertinent elements of traditional practice,
- influencing priorities in support of sanitary infrastructure investments,
- fostering client participation in organizing and managing services,
- educating women and children in domestic and neighbourhood hygiene, home care of illness, and use of services and facilities,
- strengthening community involvement, optimizing use of community resources, promoting proper utilization, extending coverage, and ensuring service continuity and quality, especially among vulnerable populations,
- providing for information exchange, technical support and training to aid community initiatives,
- widening and expanding Primary Health Care financing, and
- monitoring and evaluating progress on meeting needs.

#### Meeting established objectives for control of communicable diseases, by

- formulating and implementing national and local plans of action,
- strengthening knowledge and technology on environmental factors, including cultural and behavioural factors, in communicable disease causation, mitigation, and control,
- monitoring epidemiological data to forecast the introduction, spread and aggravation of diseases,
- controlling environmental factors implicated in the spread of tropical and other communicable diseases,
- strengthening, through Primary Health Care, community and family capabilities to promote host resistance (particularly by nutrition), prevent infection and provide early detection and treatment,
- providing health education and disseminating public information on risks and on environmental methods for control,
- accelerating research on improved and lacking vaccines and on environmentally-sound interventions,
- establishing intersectoral programmes to monitor and control diseases in agricultural, domestic, hospital, school and community settings, and
- strengthening intersectoral cooperation by seconding health personnel to relevant sectors and by providing training guidelines for risk assessment and control technologies.

#### Protecting vulnerable groups, by initiating or enhancing programmes

##### for Infants and children, which

- provide basic health care services in the primary health care context,
- educate widely on using ORT for diarrhoeas, treating respiratory infections, and preventing communicable diseases,
- provide legal protection from sexual and occupational exploitation, and
- reduce exposures to environmental hazards, including toxic compounds.

for Youth, by strengthening information, education, counselling and treatment services for health and social problems, including drug abuse and exposure to accident hazards.

##### for Women, by

- strengthening awareness and knowledge of women's health needs affected by hazards and other factors in their occupational and social environment,
- involving women in decision processes and action programmes concerned with health risks and other health problems,
- providing incentives and supports to enable participation in school and adult education courses, and
- strengthening legal safeguards against sexual and workplace exploitation.

### **BOX 3 (continued)**

for indigenous peoples, by

- supporting the provision of self-managed preventive and curative health services, including protection against environmental hazards,
- integrating their traditional knowledge and experience into provisions for health and environmental protection, and
- supporting the economic viability and cultural integrity of their communities.

**Meeting the urban health challenge**, by formulating and implementing municipal and local health plans that

- take account of the conditions that interfere with the attainment of personal and social health by all groups,
- strengthen intersectoral mechanisms that link government with scientific, cultural, religious, medical, business, social and other institutions,
- incorporate "enabling strategies" to mobilize efforts toward achieving supportive environments for health,
- ensure strong health education in schools, workplaces, and through mass media,
- foster personal and social skills for self-help and social action,
- employ health/environmental impact assessment procedures,
- strengthen government and social action programmes for environmentally sound shelter, transportation, work and health protection, and
- engage in inter-city networks for collaboration and exchanging information on practices and experience.

**Reducing health risks from environmental pollution and hazards**, including those from urban and indoor air pollution, water pollution, solid and hazardous wastes, noise, chemical use, and ionizing and nonionizing radiation, requires actions that

- strengthen the scientific information available for taking policy, regulatory and economic decisions,
- improve knowledge about combined health effects of multiple hazard exposures, including long-term, low-level pollutant exposures,
- develop, and freely exchange information on, "clean" technologies that economize on raw materials and reduce the release of pollutants,
- involve the public in combating pollution,
- incorporate health risk assessments into planning and environmental impact assessment procedures,
- improve monitoring, risk assessment and control capabilities,
- provide low-cost but effective preventive, control and abatement methods, especially for use in developing countries' homes, farms and factories,
- maintain surveillance of environmental quality and health status in local, national, and trans-boundary settings,
- forbid the use of hazardous compounds or control their distribution, transportation, application, and residuals,
- reduce the risks of accidents in transportation and the workplace,
- ensure intersectoral cooperation in planning, control and abatement work, and
- provide capabilities to respond to emergency situations.

### **Actions to strengthen capacity**

As noted previously, strategies should also address "instrumental" problems, to ensure that the community is able to take required actions to solve its health and environmental problems. In developing and industrialized countries, improving conditions and controls depends on developing needed capabilities, whether the need is for laboratory facilities, skilled human resources, effective intersectoral communications, or vigorous community participation.

Because our understanding of the problems and possible ways to solve them continues to change, no country can be said to have all the capabilities that may be required. On the other hand, the surveys reported in Chapter 2 indicate that most developing countries require massive capacity-building if they are

to provide for environmental health protection. The reported shortfalls in health protection programmes can be assumed to apply also to health promotion programmes.

Therefore, strategies must include approaches and plans to promote and coordinate governmental and private investments that can build the capacity for solving health-environment problems. Until needed resources are available, addressing certain needs - even high priority needs - may have to be deferred. Strategies should project actions by periods, matching health-environment-development objectives with increasing capabilities to assess, plan and control.

Capacity-building requires the development of both tangible and intangible resources. Tangible resources include personnel, facilities, equipment and supplies and consume most of the expenditures. Intangible resources are less dependent on funding and include political support, funding, shared views and definitions of problems, explicit policies, accepted goals and plans, clearly defined roles and relationships, workable methods and procedures, effective communications, and access to extra-sectoral decision-making.

#### Building health sector capacity

The actions need to strengthen national and local capabilities to solve health-environment problems can be illustrated by the example of the health sector. A health sector comprises the public health authorities and all institutions and individuals involved in preventing and treating ill health, including such private and public organizations as medical schools, research institutes, and pharmaceutical firms; primary health care volunteers and auxiliaries are also integral elements. Health sector needs are analogous to needs in other sectors, and several sectors might combine efforts to meet cross-sectoral needs for improved community organization, public information, and intergovernmental liaison.

The health sector's general objective is to improve its capabilities to perform the leadership, cooperative and advisory functions summarized in Chapter 3. This objective applies to the whole of the sector, not merely its governmental elements, and should address needs for better scientific, educational, managerial, promotional, enforcement and political capabilities.

Changing prevailing perceptions and attitudes, within and outside the health sector, is fundamental to all other changes. In some countries, the sector's subculture focuses on medical services to treat illness and injury, often specialized and "territorial". Less value is given to prevention, environmental and health promotion interventions, systemic problem-solving, and active cooperation with health volunteers and workers in other sectors. Antipathy toward "political" involvement restricts needed health advocacy in the arenas of public policy and community action. Often, these attitudes breed extra-sectoral perceptions that health professionals are uninterested in - and irrelevant to - development and environmental issues. Properly defining (or redefining) Health for All is critical to changing attitudes within and outside the health sector. The definition should clearly incorporate the full range of environmental determinants of health and emphasize the social action and intersectoral elements of primary health care.

The dimensions of health sector capacity building are indicated in Box 4, which defines targets for tangible and intangible resource development. The listings in that Box concern the requirements for operational systems to deal with health-environment problems.

In addition, resources are needed to formulate, design and implement plans for resource development and capacity building, a need in which international cooperation may play a critical and constructive role.

### RESOURCE DEVELOPMENT CATEGORIES IN THE HEALTH SECTOR<sup>1</sup>

#### Tangible Resources

- **Personnel** - scientific, technical, auxiliary, volunteer and managerial - in adequate numbers and trained or retrained to perform their respective functions in the defined environmental strategy for health.
- **Facilities and equipment** necessary for the performance of risk assessment and management, administrative, information support, and educational functions; capital-intensive investments in buildings, laboratories, information-processing, transport and training supports are of special concern within the sector, as are investments in sanitary and control infrastructures through other sectors.
- **Maintenance and replacement capacity** to ensure continuous and good quality operation of facilities and equipment.
- **Supply systems** capable of meeting needs in operations and training.

#### Intangible Resources

- **Operational definitions of environmental health** in the context of Health for All and Primary Health Care, as related to socioeconomic development and environmental preservation.
- **Enabling legislation, standards and regulations** adequate to provide authoritative guidance to governmental and private entities.
- **Negotiated agreements among organizations** including those in other sectors and private organizations, specifying functions, responsibilities, linkages and obligations.
- **Necessary skills in risk assessment and management**, appropriately distributed to all relevant parts of the sectoral and intersectoral organization, with planned arrangements for adding new skills and updating skills of existing personnel.
- **Established information support systems**, linked within the sector, intersectorally and, as necessary, internationally, to provide the scientific, technical and situational/monitoring information required for policy decisions, planning, operations, research and programme evaluation.
- **Established communication channels**, providing access to decision-makers and ongoing, systematic information exchanges between sectors (at national, intermediate and local levels) and with non-governmental and community organizations.
- **Defined protocols and procedures**, to carry out operational, communications, training, and management functions, within the sector and among sectors, including constituent public and private organizations.
- **Programming and arrangements for public information and education**, on a continuing basis and in emergency or hazardous situations.
- **Provisions for training of personnel**, in the health and related sectors, including continuing and refresher education, according to standing agreements.
- **Linkages to promote and support community participation**, through the health sector and jointly with other sectors' community staffs and volunteers.
- **Progressively increasing good will and acceptance**, on the part of the public and collaborating organizations and groups, as well as health professionals.

<sup>1</sup> Comparable resource development pertain to most of the sectors to be involved in environmental strategies for health.

## Improving knowledge and "know-how"

Existing knowledge about health-environment interactions and methods to modulate them can support vast improvements in policy decisions and programming, if more countries and localities had the capabilities to apply it. Apart from making that knowledge more widely and effectively accessible (itself a subject for operational research), finding better solutions for health-environment problems depends on adding to our knowledge and devising more practical methods to apply both existing and new knowledge.

As the WHO Commission on Health and the Environment reported that, although the range of knowledge and methods is extensive, there is still a large deficiency in data and information in many areas. Many research subjects need to be further divided according to different settings; for example, different effects of being exposed to a hazard in tropical and non-tropical climates, or how to modify control methods used in industrialized societies to make them practical in a poor countries. Providing more certain knowledge to underpin decisions on policies, standards and programming presents a critical research challenge.

Specific examples of research needs identified by the WHO Commission are found in Box 5, which should be compared with Table 2's listing of problems and actions in the same sectors. More general goals for research and development in health-environment interactions are:

- better assessment of risks from environmental hazards, those for which information is entirely lacking and those whose assessments are disputed and tentative; for example, advances are needed in quantitative determination of dose-effect and dose-response relationships of hazardous agents, alone and in mixtures; and in understanding relationships between urban environments and somatic and mental dysfunctions, the differential effects of exposures at various ages or health states (as when people are well-fed or undernourished), and the combined and synergistic effects of simultaneous, long-term, sub-acute exposures to multiple pathogens.
- more rapid methods to assess risks, especially those that appear in populations too small to provide clear epidemiological evidence, those where adverse effects of low-dose exposures take a long time to manifest themselves, those for which historical data on exposures are lacking.
- additional methods for assessing and managing risks, including stronger techniques for the prevention, as opposed to the remediation; efficient resource use; environmentally sound control of hazards and pathogens; adaptations of methods to make them useful in resource-poor settings; and the integration of health factors into environmental impact assessments and development planning.
- improved capabilities to resolve social and behavioural issues, including incentives and sanctions, motivation, participation, and community action, many of which may have to be investigated in particular settings.
- better support of economic, policy and managerial decision-making, including clear indicators of need, effectiveness and benefits; relating those indicators to financial, social and health costs; measurements of community environmental health status; evaluation of programme alternatives; mechanisms for integrating programmes and sectoral/organizational efforts; more efficient information support systems; and facilitating information technological and educational exchanges.

## **BOX 5**

### **EXAMPLES OF NEEDED RESEARCH INTO ENVIRONMENTAL FACTORS**

#### **Food and agriculture**

- Effects on health of current agricultural production practices and food consumption patterns
- Meeting rising needs for food and for control of tropical diseases, without adversely affecting the natural environment.
- Agricultural, distribution and consumption practices that support sustainable development of agricultural resources, while improving the safety and nutritional quality of food

#### **Water resources**

- Reducing the waste and pollution of freshwater and marine resources and adverse effect on aquatic life
- Alternatives for meeting water supply and sanitation needs, considering technological, financial, managerial and consumer behaviour elements
- Alternative, affordable technologies for wastewater treatment and reuse, while protecting against microbiological and chemical agents

#### **Energy**

- Reduction in the use of fossil fuels through such alternatives as waste conversion, solar/wind/geothermal technologies, and small-scale hydroelectricity generation
- Intrinsically safe nuclear reactors and more satisfactory methods to dispose of nuclear wastes
- The environmental pathways, form and extent of human exposure to energy-related pollutants, notably those of power generation and transportation
- Definitive information on the health effects of electro-magnetic fields
- Quantitatively assessing the benefits and costs of different energy options
- Reducing the adverse health effects of using biomass fuels

#### **Industry**

- Cause-effect, dose-effect and dose-response relationships in assessing (a) the toxicity of chemical mixtures and (b) mixed exposures to chemical, physical and biological agents
- Reliable "quantitative risk assessment" in situations where humans are exposed for long periods to low levels of chemical and physical agents
- Assessment of health effects of chemical before their introduction
- How pollutants reach the body and are absorbed; somatic, genetic and behavioural responses (including immune responses)

#### **BOX 5 (continued)**

##### **Industry (continued)**

- Integrating data on exposures from all routes into a total dose assessment
- Validated biological markers to ascertain the actual extent of human exposures, identify populations at particular risk, and strengthen preventive interventions
- Applicability of occupational health data from industrialized temperate zone countries to populations in industrializing tropical countries

##### **Urbanization and human settlements**

- Practical, adequate systems of national and municipal statistics to support urban planning, development and management
- Indicators that can accurately measure intra-urban and inter-district health and environmental conditions, so as to analyze needs and design appropriate interventions
- Low-cost technologies, appropriate to various settings and sizes of human settlements, that can equip local government and community initiatives and enable them to manage the domestic and neighbourhood environments, so as to provide basic services and to reduce waste generation, pollution, and avoidable hazardous exposures.

To conserve time and resources in pursuing these research/development goals, while meeting priority needs and avoiding duplicative efforts, research agendas should be established cooperatively among institutions, enterprises, and agencies, under the auspices of governments and international organizations. Research action plans - national, regional, global - should identify needs, determine priorities, assign tasks, and allocate resources. Disciplinary research is needed, although interdisciplinary research, under an inter-sectoral frame of reference, is an even greater need. Most countries will have to mobilize financial support and, in varying degrees, develop requisite human and institutional resources.



## **CHAPTER 5. INTERNATIONAL ASPECTS**

Because Earth's biosphere and its life-supporting resources of air, water land and species is finite, every country and its inhabitants have a stake in preserving the planet's natural environment. Because the adverse effects of environmental insults and economic practices often transcend man-made national boundaries, countries have to cooperate to avoid damaging one another and the global commons. And because needs and resources are unequally distributed among nations, countries need to support one another's efforts in environmental preservation and sustainable development.

### **Transboundary and global problem-solving**

Activities that protect, damage, or mitigate damage to the natural environment occur at every level of social organization, from the household to the community of nations. Individual behaviours in consumption, child-bearing, transportation, harvesting, shelter, and waste disposal - often determined by societal forces - have overwhelming cumulative impacts on local environments. In varying degrees, they can affect more distant environments and the prospects for health, for example, by the transboundary movement of pollutants and pathogens, or when adverse economic, political and environmental conditions induce people to migrate.

Inefficient industrial production, waste management, and transportation processes may likewise impact other countries' seacoasts and surface waters, as may pollutants borne by prevailing winds. Trade, marketing, defence, energy, industrial, intellectual property, and environmental policies of governments (and enterprises) can produce environmental damage in neighbouring and more distant countries, as well as depleting non-renewable resources and the basic resources of air, water and soil.

To minimize such damage, countries must not only negotiate and cooperate with one another at international and regional levels, but also promote health and sustainable development within their boundaries. Whether by persuasion or controls, the behaviours of individuals, organizations, and communities have to be influenced toward those goals. As global interdependencies increase, every country has a stake in environment-affecting actions that occur in others.

Regional and global environmental change have enormous implications for human health. Some of these implications, like increases in skin cancers from stratospheric ozone depletion, are calculable; others, like the impacts of global warming on disease vector populations, food supply, and coastal cities, can only be calculated approximately.

### **International cooperation and support**

Wide-ranging cooperative actions are needed to halt, if not reverse, adverse environmental trends and their impacts on the health and survival of the human species. Moreover, every country is dependent upon international actions to varying degrees to meet national needs: in industrialized countries these dependencies centre on the better sharing of technical information and methods, while many poor countries require a far broader range of support to build their capacity to control their domestic situation and contribute to global cooperation.

Needed international actions fall into two interdependent groups:

- actions that establish practices supportive of environmental health, including the contributions to be made at local and national levels; these actions must carry forward from the Agenda 21 agreements to specify norms that can orient national policies, improve knowledge about how better to measure and intervene in environmental change, and generate and disseminate effective methods for environmental control; and
- actions that raise the capabilities of all nations to pursue sustainable development, including actions by which countries share with one another the technical and material means that will enable even the poorest countries to deal with the environment in ways that contribute positively to the welfare of their citizens and thereby to the welfare of all peoples.

To be effective, such international cooperation must be "intersectoral" and coherent, fitting action for health into the wider framework of sustainable development. As at the national level, the objectives of sustainable development can be met only if the public health community is able and allowed to contribute to trans-national development and decision-making processes, as they are carried out through existing diplomatic and development-assisting institutions and the new cooperative arrangements established by Agenda 21. The latter include a new Commission on Sustainable Development and the Global Environment Facility (GEF) of the World Bank, as well as such regional counterparts as may be developed.

Agenda 21 (in its Chapter 38) made it clear that the existing United Nations entities not only have a continuing role to play in implementing its substantive proposals, but that those entities must be reoriented, revitalized and re-equipped to carry out expanded functions in sustainable development. The implications of this policy for the World Health Organization serves as an example of the changes to be brought about.

#### **Role of WHO and collaborating organizations**

Since its establishment, WHO's primary constitutional function has been "to act as the directing and coordinating authority on international health work". Under that function, WHO and its Regional Offices have engaged in technical cooperation with countries in environmental health, collaborating with other international and bilateral development assistance organizations.

The scope of its environment-related activities has progressively widened, in response to the world's changing situation. Its early and continuing work in water supply and sanitation has expanded to deal with the health aspects of environmental pollution, chemical safety, food safety, occupational health and the complex of issues implicated in urban and rural development. Its environmental health activities fit within the framework of the larger policies of Health for All and Primary Health Care adopted by the Organization and its Member States.

In Agenda 21, WHO is explicitly charged with international-level responsibilities for protecting and promoting human health and in the area of chemical safety, collaboration between WHO, UNEP and ILO in the International Programme on Chemical Safety is specifically recommended as the nucleus for international cooperation in this field. Implicitly, it shares with its Member States an involvement in the many aspects of the natural and social environment illustrated in Table 1. To fulfill its responsibilities to support countries and contribute to the solution of global health-environment problems, WHO has developed a new Global Strategy for Health and Environment with the following objectives:

- To support countries in providing the environmental elements of *basic health needs*.
- To promote increased *awareness* and understanding of health-environment-development interactions on the part of leaders and the public, so as to strengthen *community action* for health and sustainable development.
- To collaborate with national and local authorities in the creation of *supportive environments for health*.
- To advance the *central role of health* in environment-development decision-making and programmes, and to foster partnerships of the health and related sectors in these processes.
- To strengthen capabilities for *emergency preparedness and response* in relation to the public health aspects of disasters and violent conflicts.
- To strengthen national capacities for *human resource development* in health-environment-development work.
- To improve technical capabilities for the *monitoring and assessment of environmental risks* to health.
- To improve technical capabilities for the *management of environmental risks* to health, including their prevention, abatement, and control.
- To strengthen local, national and international *environmental health information systems*, to support the exchange and proper use of information.
- To promote *research* toward a progressively stronger scientific and technical basis for the wide range of interventions needed to achieve the health goals of sustainable development.
- To foster *environmentally sound technologies and management* in the prevention and control of disease and disability.
- To promote and support other aspects of *institutional and sectoral capacities* that will provide stable and progressively improving health-environment-development policies, plans, legislation and actions.

In fulfilling these objectives, WHO serves as a resource to communities, countries and international organizations in formulating and implementing new environmental strategies for human health so badly needed throughout the world.